

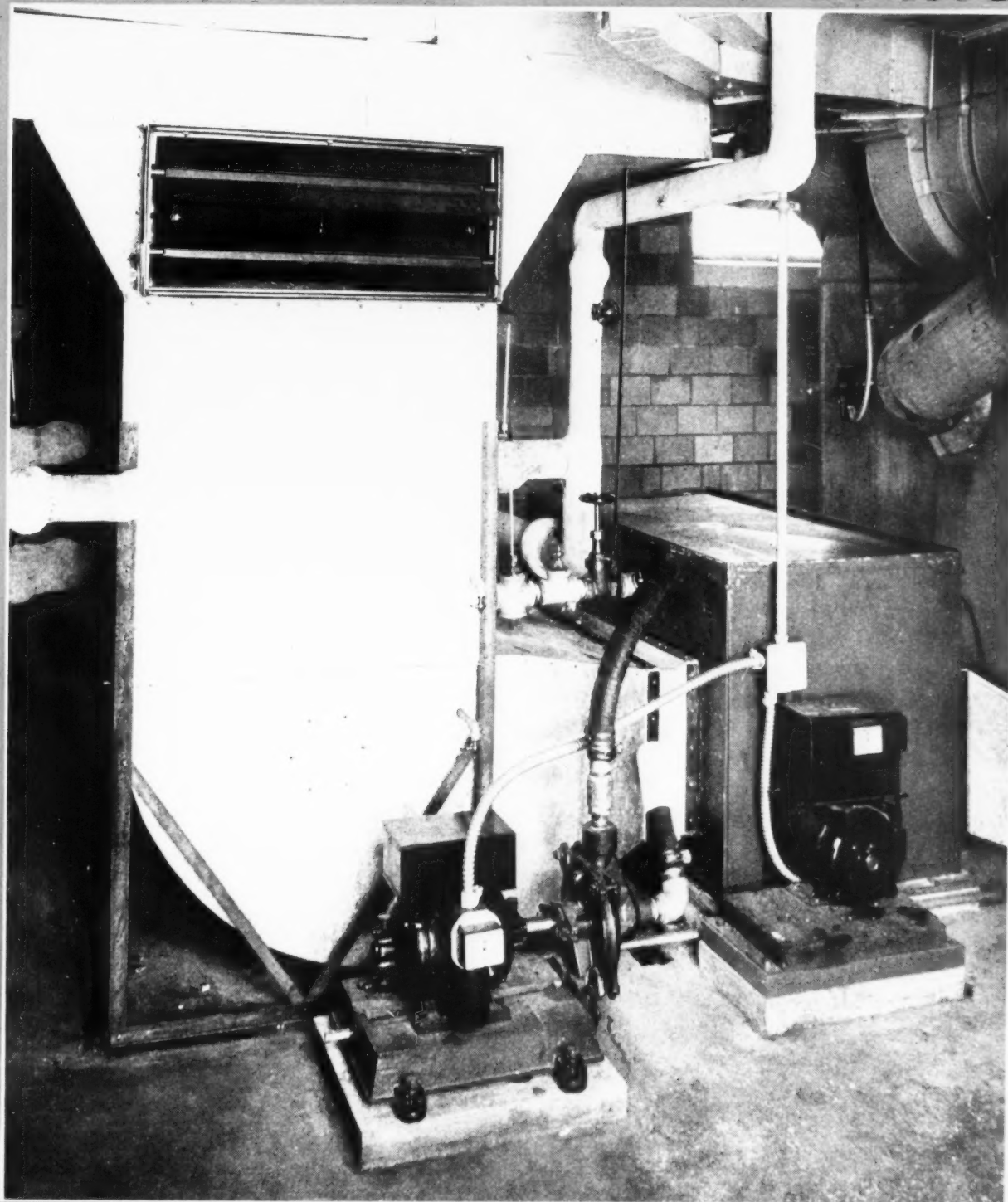
AMERICAN ARTISAN

FARM AIR HEATING • SHEET METAL
CONTRACTING • AIR CONDITIONING

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MERGED
FURNACES
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AND

Form-Air
Heating

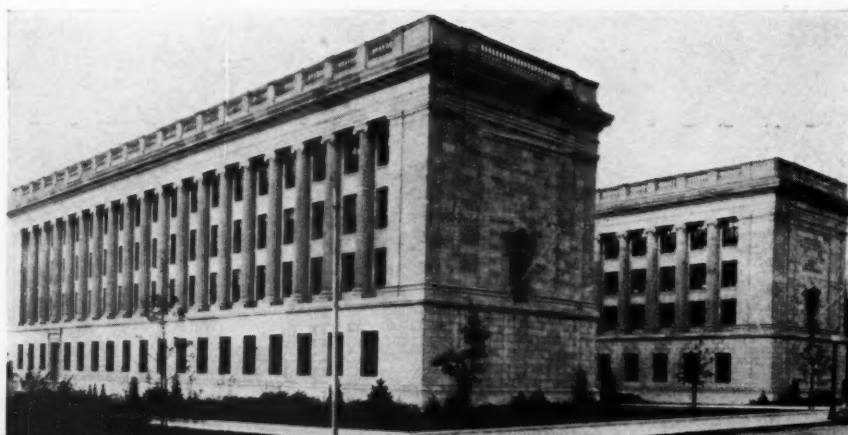


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JUNE
1933

New Jersey **PROFITS THROUGH THE USE OF TONCAN IRON**

*New Jersey State Office
Building Annex, Trenton,
N. J. Architect: J. Osborne
Hunt, Trenton, N. J.*



*Soldiers and Sailors Mem-
orial, Trenton, N. J. Arch-
itect: Louis Kaplan,
Trenton, N. J.*

Nineteen thirty-two saw the completion of two beautiful buildings in Trenton, N. J. And in both of these structures Toncan Iron will play an important part for many years to come.

In the New Jersey State Office Building Annex, and in the Soldiers and Sailors Memorial, both in Trenton, N. J., all the ventilating ducts are made of Toncan Iron.

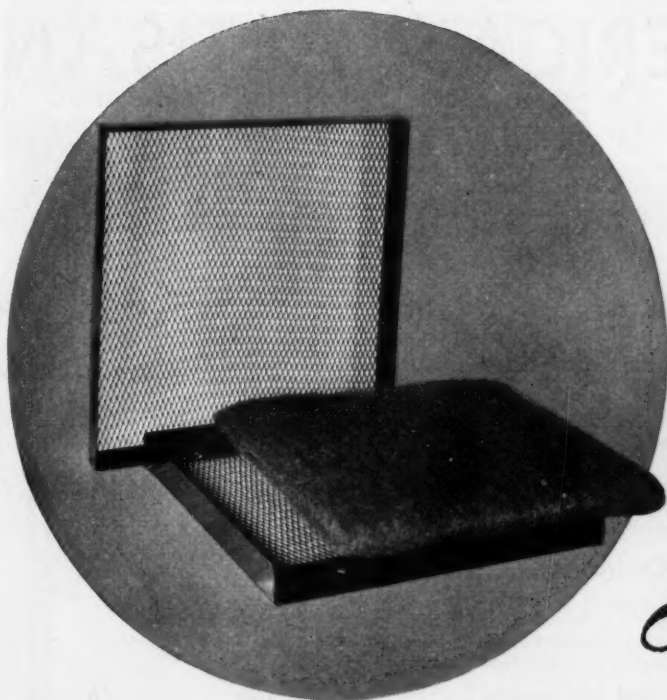
For duct work there is no finer material than Toncan Iron. From the standpoint of the building owner its resistance to corrosion is of first consideration. It is an alloy of refined iron, copper and molybdenum ranking first

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GENERAL OFFICES  YOUNGSTOWN, OHIO



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THROWAWAY FILTER—identical to the Re-Nu except that the pad is held in a heavy card-board container.



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Air Conditioning
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SHEET METALS**

AND

**Warm-Air
Heating**

Vol. 102, No. 6

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More than 7,000 copies of this issue are being distributed.

— **THE J. M. & L. A.**
OSBORN Co →
DETROIT—CLEVELAND—BUFFALO

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SERIES No. 3

NUMBER 3



Circular bar designed by Joseph Urban, Architect. Constructed of Monel Metal, this installation is a good illustration of the modern trend in bar design, and shows Monel Metal at its best as a decorative and construction material for this type of service. Manufactured by Nathan Strauss & Sons, Inc., N. Y. C. Photograph by Nyholm.

MONEL METAL MEETS "3.2"

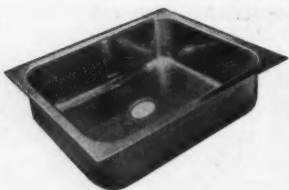
*Legal beer opens up profitable opportunities for
live sheet metal contractors*

\$100,000,000 . . . TO BE SPENT SOON

When the brewers' big trucks began to roll out their loads of 3.2 legal beer, a lot of hotels, restaurants, taverns and lunch stands suddenly discovered that a bar is absolutely essential. There's no other quick, easy way to dispense draught beer, even where waiters are serving customers at tables and there is no "stand-up trade."

Live sheet metal contractors have learned that there's nothing like Monel Metal in fine bar work. The handsome appearance,

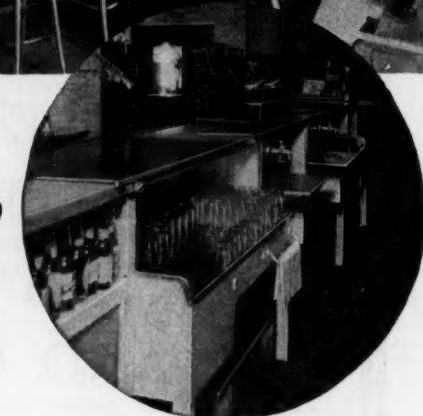
MONEL METAL
Seamless Flat Rim
Sink Bowl, Gauge
10 U. S. S. (.045")
in two standard
sizes: INCO 1880
18" x 30" and INCO
1885 18" x 35". Both
are 4 1/4" deep (in-
side dimension)
and have 1 1/4"
flange.



alone, of Monel Metal gains it a leading place in this new use. And it's not so "new" either, for leading steamships, clubs and hotels have already led the way by putting in Monel Metal installations that show what modern bars can really be.

The big point to remember is this: Monel Metal bar equipment not only looks better than other fittings . . . it's also less subject to wear and corrosion. And it stands up under the constant scrubbing and cleaning to which bar fixtures are subjected.

Whenever you figure on a bar job, just remind your customer of the use of Monel Metal in the food service applications of hotels and restaurants. Also how Monel Metal . . . in food dis-



"Barkeep's-eye-view" of bar in tap room of a well-known Canadian hotel, showing sink, drainboards and counter top of silvery, rust-proof Monel Metal.

play cases, in modern lunch room and cafeteria equipment, and in soda fountains—has, by its bright attractiveness, proved itself to be a big *trade builder*.

And when you're talking "bar equipment" to a customer, don't overlook Monel Metal sinks etc. behind the bar . . . or the chance to put in a Monel Metal steam table or serving table for the lunch counter.

According to plans already announced by newly licensed beer sellers, \$100,000,000 will be spent at once for new bars and dispensing equipment. That's a slice of business worth going after.

MONEL METAL

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

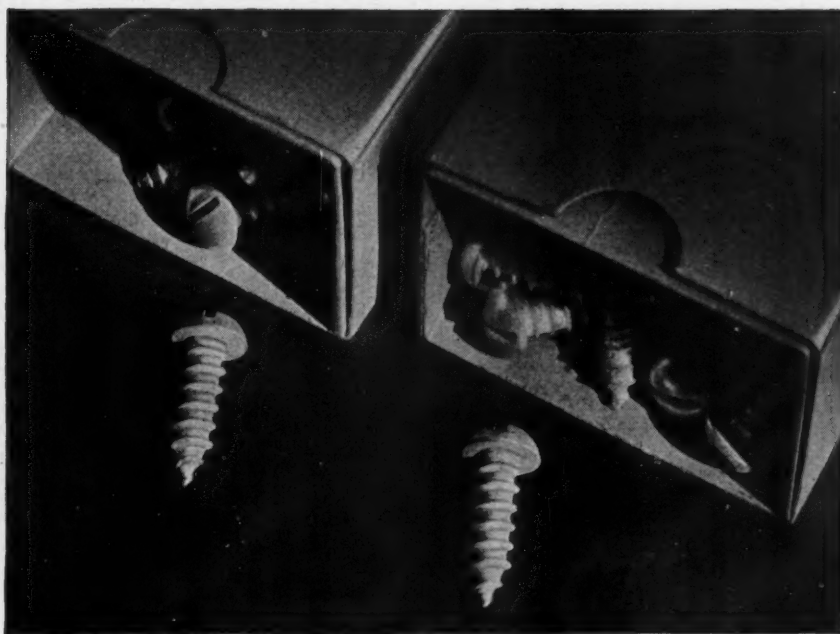
THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.



SURE . . . They Look Alike

BUT . . .
*sparkle doesn't
make a diamond*

NOR . . .
hardening a wood screw make a Sheet Metal Screw



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SHEET METAL SCREWS**

HOLD . . . because the threads run full diameter right up to the head.

GO IN EASILY . . . because the threads are (1) designed with an expert knowledge of the work they must perform (2) held to a high degree of accuracy and uniformity.

THREADS DON'T STRIP—HEADS DON'T TWIST OFF because they are made from a high grade steel wire of special analysis, and are scientifically hardened by a process developed from 20 years experience in the manufacture of Self-tapping Screws.

IN buying diamonds . . . or screws to assemble sheet metal you can't depend on "LOOKS". For there's more to a diamond than sparkle. And there's more to a genuine Sheet Metal Screw than hardened threads. That is why imitations are bound to give imitation results.

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this perfect action which gives you the savings invariably made with genuine Sheet Metal Screws.

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Remember, there's only one Sheet Metal Screw, PARKER-KALON
Imitations give imitation results

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A BUSINESS executive, recently returned from a trip abroad, made the statement at a luncheon that foreign business men and technicians read our American business papers to find out what is happening in their own countries. This is, of course, a fine tribute to the American Business Paper, witnessing to its vision, independence and initiative. In no other country in the world do busi-

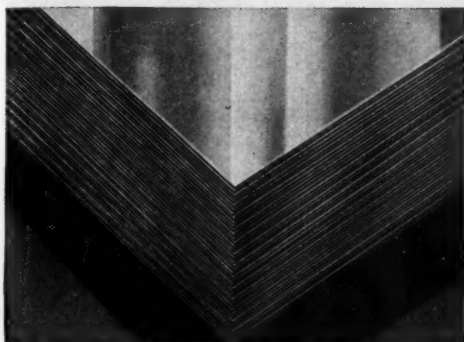
ness and technical executives have an authoritative business press, such as we have in America. And an advertising man, experienced in industrial merchandising, said recently that we take our business papers too much for granted. In the perspective of the foreign executive, seeking light on his business and technical problems, the American Business Paper looms importantly.



What are the features which give the American Business Paper so high a place in the esteem of foreigners?

Unquestionably the first and most important characteristic of the American Business Paper is its independence of opinion. Our Business Papers range all the way from those newsy, informal types, made up like newspapers, through all degrees of dignity and formality, to the quarterly, amazing in the style with which it is designed. American Business Paper editors are of all types—with one thing in common: a wide experience in their own fields and sufficient general business knowledge and experience to keep them sane in their pronouncements. They are competent, and they speak their minds frankly, with the larger interests of their industries always in view.

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Below are illustrated the attractive entrance, doorways, and the escalators of the Philadelphia Saving Fund Society Building, Philadelphia, Pa. USS 18-8 STAINLESS Sheets were used in the construction.



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Literature descriptive of these various grades and their properties will be furnished promptly upon request.

CHROMIUM-NICKEL Steels, *Austenitic*: 18-8; 18-12; 25-12.

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The exhibit is of steel—in execution as well as in purpose—of raw steel, no paint. The furniture is especially designed to demonstrate the beauty possible with steel. The ceiling and other portions of the exhibit show the utility of steel—visualize the rewards of tradition-breaking design.

The floor is a demonstration of how appearance and safety can at last be combined at economical cost by the use of Inland 4-Way Floor Plates. Views of steel making processes are carved on the steel sheets used for the walls. Colored spotlights bring out the fiery beauty of steel in the making. Another portion of the exhibit shows the progressive steps in the development of the railroad rail. And a moving picture portrays Inland's great Continuous Strip Mill.

In short, the Inland Exhibit visualizes A Century of Progress in the development and application of steel. You are cordially invited to visit this exhibit which is in Booths 8 and 9, Group D, Unit No. 2, First Floor, General Exhibits Building. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago, Illinois.

INLAND
ABLE SERVANT OF THE CENTRAL WEST
STEEL

Sheets Strip Plates
Bands Structural Piling

Rails Track Accessories
Bars Rivets Billets

Trends of the Times

Trade in Selling

Industries are said to expand and go forward on the backs of ideas developed by individuals or organizations. In many instances these ideas are

scoffed at by the first listeners and frequently rejected by the entire trade as impractical, unprofitable and dangerous.

One of the most intriguing ideas presented lately is the idea of selling new furnaces on a trade in basis. Of course this cannot be claimed as a brand new idea. We know a number of dealers who practice this idea, but in every instance they do trading because it is the only way to close the sale.

But the idea behind this suggestion of trading in old furnaces on new ones is to put the furnace business on the same basis as the automobile sale. In the automotive field the manufacturer periodically introduces new models designed to make you dissatisfied with your present car. Your old car may go as fast as you care to drive, it may use just as little gas as the new model, its paint may be good and the engine may purr to any mechanics' liking. But—the automobile manufacturer wants to sell new cars and he can't until you get dissatisfied with the one you have.

The furnace industry has air conditioning. Its appeal is just as strong as was the appeal of the first car which would do seventy. Thousands of people would like to have air conditioning, but their present furnace heats the house comfortably, it doesn't use any more fuel than the owner considers necessary, and it has been in use only five or ten years. Why buy a new furnace?

That probably was the identical problem faced by the automobile manufacturers when they first offered to take in your old car in trade. Then they had to develop a market for the old cars. Today this second hand market is a very definite part of the automobile picture.

The furnace industry has a class of buyer who can advantageously buy a second hand furnace. That buyer is the present user of stove heat. He, in turn, wants central heating, but he can afford only a small expense for equipment and operation. This class of buyer is especially noticeable today, when families have moved into cheaper quarters, doubled up, gone back to the farm and so forth.

It should not be too difficult for any dealer to find out just how much of a market for second hand furnaces his trade area possesses. Once he knows this he

can then make a planned drive to get the required used furnaces from those owners he considers his best prospects for 1933 model equipment. The success of such a program would, naturally, lie in the thoroughness of the dealer's investigation and his determination to sell both new and used according to his plan.

The Beer Business

“How can I cash in on the beer business” is the question of most interest to all businesses today. Industries directly concerned with the manufacture, sale

and distribution of beer have already felt its stimulus. Other industries, not so directly concerned, perhaps, are or will feel this stimulation in about the proportion that they devote thought, planning and effort to the getting of business from beer.

So far as the sheet metal contractor is concerned we find big shops and little shops, coppersmiths and metal workers all actively planning for and getting profits from work connected with the sale of beer.

At this time the situation is not entirely clarified. Some states now prohibit the sale of draught beer. Other states do not permit beer to be consumed at the place of sale. Some communities and certain localities do not permit the sale of beer in any form or are debating license fees, taxes and laws governing control.

Generally speaking, there seems to be little work for the sheet metal man connected with the sale of bottled beer. The situation with draught beer is, however, something else again. Draught beer requires storage tanks for the barrels in pre-cooling, coolers for the beer at the tap, service drains in old and new bars, sinks and trays for the glasses, etc.

Where old equipment is to be used, much of the old metal work requires replacement. New equipment is on the market, but much of this is high priced and out of reach for the men who expects to sell a half barrel or even a barrel of beer a day. Much of this barrel or even a barrel of beer a day. This new equipment is, however, well constructed and attractive and readily salable by any contractor versed in merchandising.

There is right now and will be an enormous market for the type of iced cooler shown in our May issue and described in this issue also. These units are easy to fabricate, they can be sold at a price which makes prospects of the smallest type of roadside stand and sales can be made from a traveling display.

Automatic Controls

What are we trying to sell the public? Not gas, or oil, or humidity, or furnaces, but comfort and convenience. And the thing which insures these is automatic control. What do we know about controls? What control equipment is available? What hookups can be used? What is the particular advantage of each? The answers to these questions will be found in this series of articles.

NO matter how carefully the equipment for a forced air heating system is selected—and no matter how technically correct the design for that system—the installation will not function satisfactorily for the owner unless careful study is given the selection and application of the electrical controls which will govern the system's operation.

Controls are, therefore, vitally important in the success of any heating system. Despite this importance, however, the average heating contractor—and even some engineers—choose and apply controls by guesswork and trust that the system will function.

Perhaps we should not be too critical of this attitude for controls generally speaking have not benefitted by as much field experimentation and, further, these mechanisms are not thoroughly understood or appreciated by many men doing forced air work.

The purpose of this series of articles is to present the subject of controls as developed to date, to outline the things every control system ought to do and to show how various hookups will bring about interior conditions satisfactory to the owner. The series will not deal with the subject in general terms but will discuss controls by showing different types of hookups now in use and point out the good and bad features of each system.

Obviously, a series of articles of this kind cannot cover all the hookups in use by contractors, nor can it cover in complete de-

tail all the basic information required to thoroughly understand the operation and design of the control units themselves. For the purpose of these articles we will assume that the manufacturers of equipment have worked out the "bugs" and have sound reasons for adopting the principles and styles of equipment marketed.

It has been stated many times that controls are the brain of the forced air system. Upon the control system rests the proper functioning of the equipment selected and the proof of the engineering calculations so painstakingly worked out to insure a system which will give adequate heat,

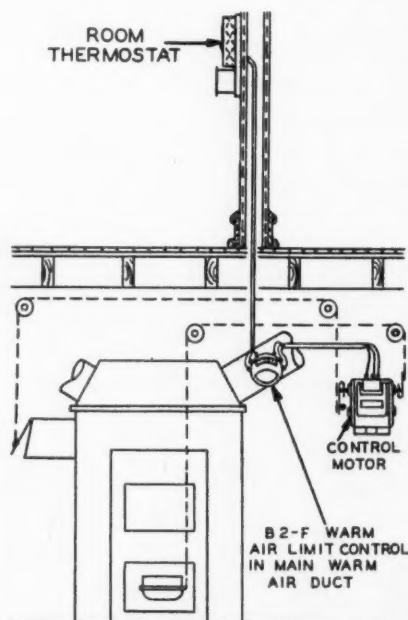
humidity, cleanliness, safety, circulation and temperature uniformity.

Before we discuss controls applied to forced air systems, let us refresh our memory for a moment on the history of controls up to three years ago. We are all familiar with the gravity control system wherein the draft and check were connected by chains to an indicator on the first floor. To get heat the draft was opened and the check closed. When the house was warm enough the chains were reversed.

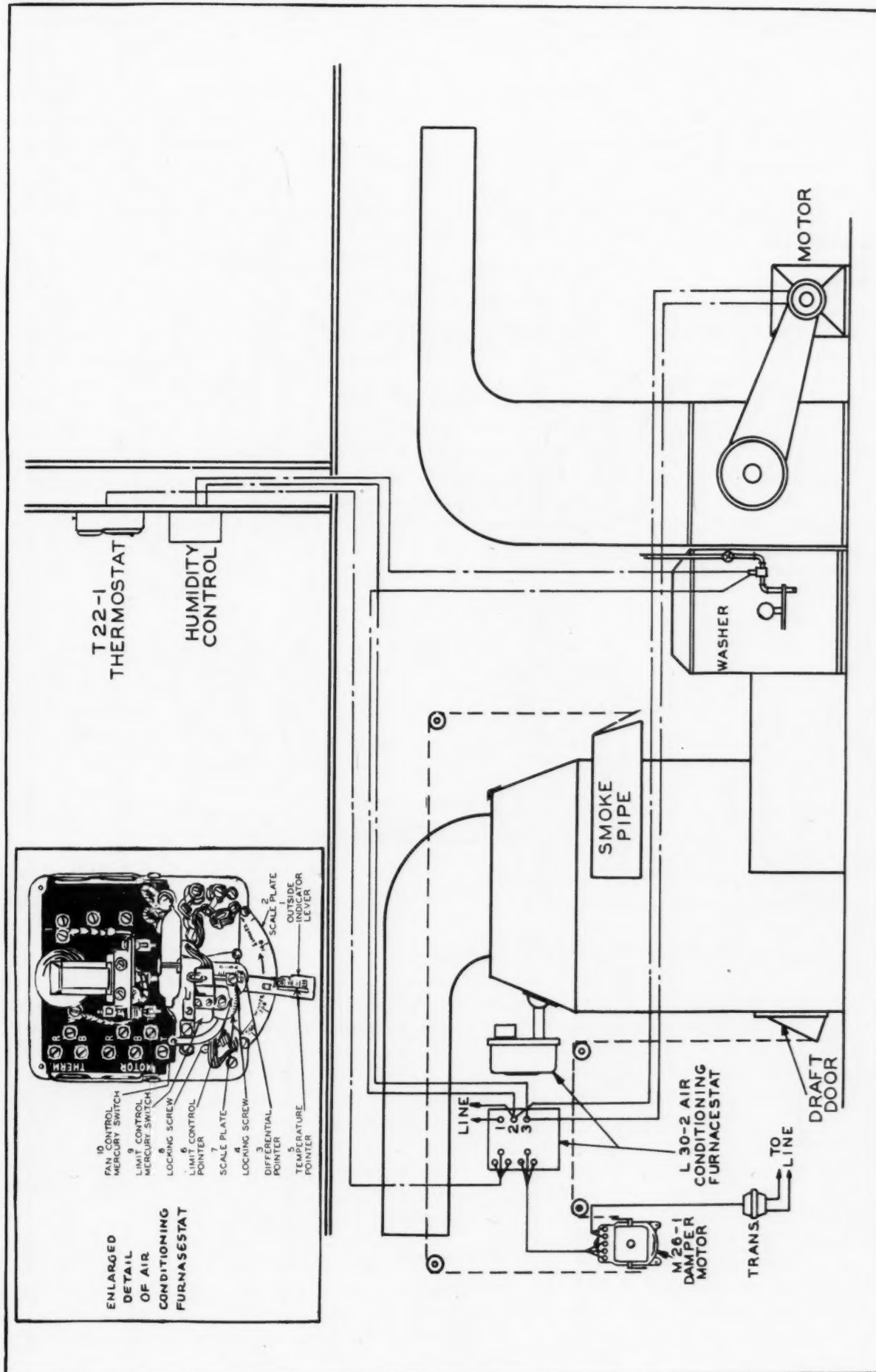
This system saved many steps but had some real faults. Without a thermometer the owner could only guess at the temperature with the result that inside temperatures fluctuated through a wide range. This increased fuel costs and gave unsatisfactory temperature conditions. Furthermore, the owner often forgot to close the draft resulting in high overruns of the house temperature, burned out furnaces and other troubles.

It was natural then, that manufacturers and contractors should develop systems whereby temperatures could be accurately controlled by a thermostat and the draft and check operated by mechanical or electrical means at the bidding of the thermostat.

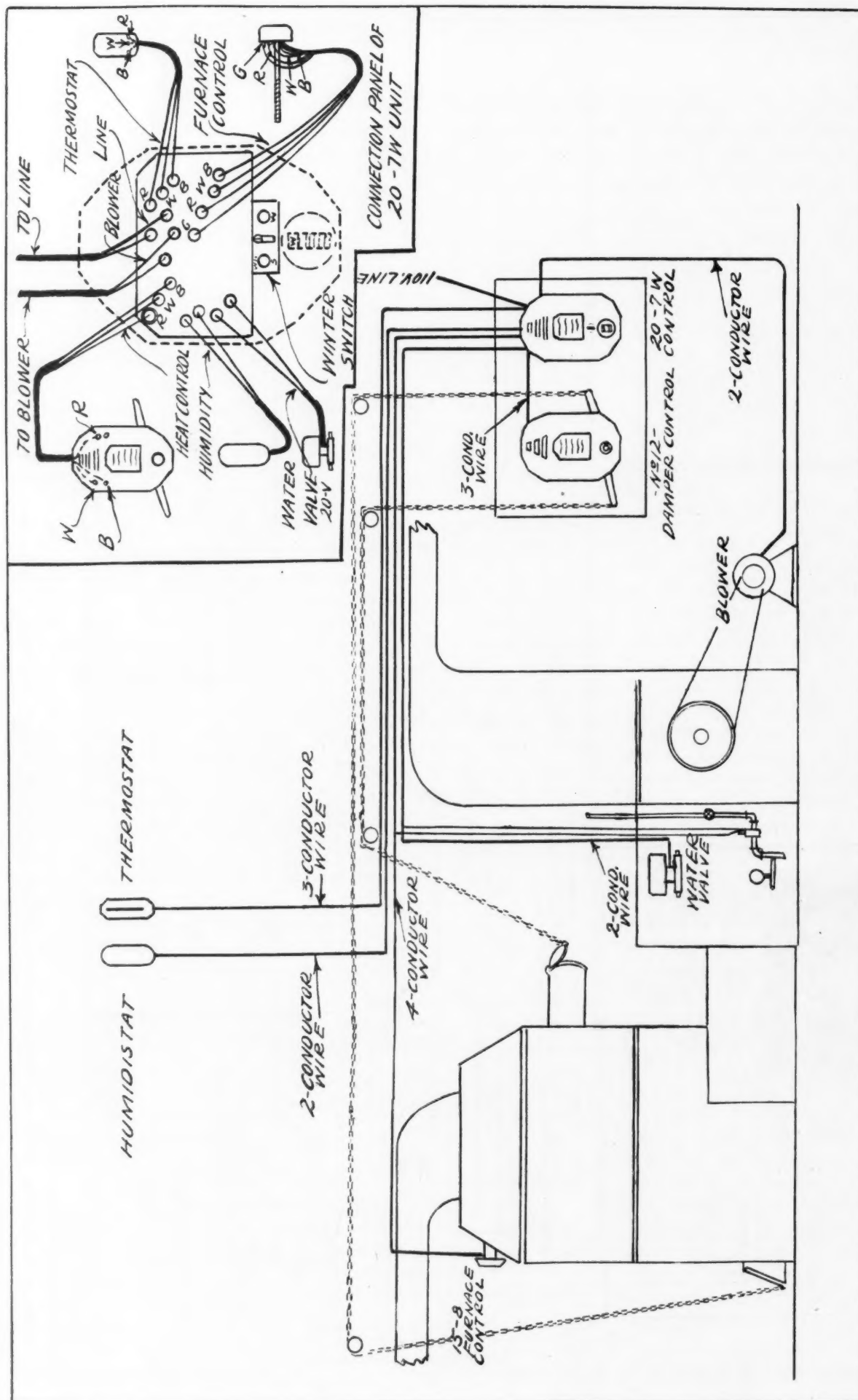
The next step in developing these early control systems was to get closer temperature control by the installation of a unit placed in the bonnet of the furnace and set at predetermined temperatures so that when casing tempera-



The above hookup is one of the earliest and one of the most popular. Its advantages and disadvantages are discussed in the text



In the hookup shown above, using Minneapolis-Honeywell controls, the damper and check are controlled by the room thermostat. The fan is controlled by a thermostat located in the bonnet. When the room thermostat calls for heat, the damper opens. When the bonnet temperature reaches a predetermined setting, the fan starts. When the room thermostat is satisfied, the damper closes. The fan continues until the low setting of the bonnet control is reached



Above is a hookup similar to the other drawing, but using Cook Electric Co. controls. In general, the drawback to this hookup is over-run of the room thermostat due to residue heat in the bonnet. The advantages are simplicity of equipment, uniform register and bonnet temperatures

tures reached a set point the draft was closed and the check opened regardless of the demand of the room thermostat.

Settings for this bonnet control were worked out principally by trial and error. The general idea was to shut down the draft far enough in advance of the call of the room thermostat so that little or no over-run of temperature upstairs would occur. The principal trouble with selecting this temperature was that the setting of the bonnet control had to be synchronized with outside weather conditions. This proved difficult because when controlled manually the owner forgot and an instrument operated by the

and turned on the fan. It did not take long to find out that this system would not work because the fan blew cold air into the house and much of the heat generated was wasted because the fan shut down leaving residue heat in the bonnet.

Again, the bonnet control was called into service and the fan was controlled by this bonnet thermostat. Bonnet controls were produced with rather close cycles—about 15 degrees—and were graduated to cover a range of temperatures from 100 to 500 degrees.

The contractor selected the temperature at which he thought the fan ought to turn on and so set the bonnet control. When the bonnet temperature reached this setting the fan turned on and con-

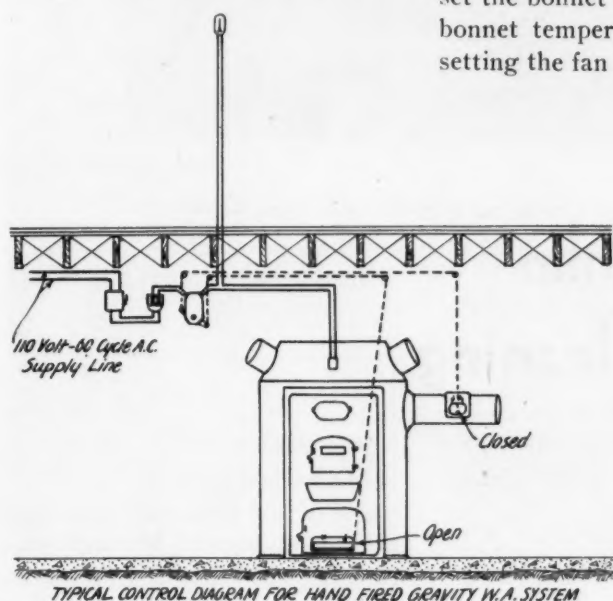
was probably the earliest combination adopted. A variation of this hookup brought in the limit control which acted in reverse order from the fan switch causing the drafts to close when the bonnet temperature exceeded a predetermined point. When wired into the circuit with the other two controls and correctly set it reduced overrun of room temperatures and conserved fuel.

This control hookup continues to this day as probably the commonest type of control system despite the fact that other and better systems have been developed for hard fuel. And it should be noted here that despite the fact that this hookup is still the commonest system in use, contractors are still guessing at the proper settings. We should also note here that settings should be made according to the particular job and that no two installations require identical settings. The reason is that exposure, wind direction, location of room thermostat, capacity of the fan, velocities of the air, type of fuel used (hard or soft coal or coke), architecture and arrangement of rooms all have their effect on the settings.

Also it should be noted that settings depend primarily on the register temperatures chosen and that register temperatures must, in turn, depend upon velocities of air through the piping system and distance of registers from the furnace.

Too often the possibilities of getting comfort by proper control are neglected by the contractor in favor of attempts to get comfort by dampering the piping system.

Today all the manufacturers of control equipment make the units required for this commonly used hookup. Two typical hookups of manufacturers' equipment are shown with this article. In the July issue we will show the same hookup with other manufacturers' equipment and discuss some of the good and bad points of this hookup.



A variation of hookup number one uses a limit control in the bonnet to reduce over-run of the room thermostat by closing the damper ahead of the bidding of the thermostat. Here is a typical such hookup

outside weather was too sensitive and changed settings between daytime and nighttime.

These, then, were the control applications generally understood and generally used by warm air heating contractors when fans appeared. With the advent of fans, contractors found that a whole new set of problems faced them in trying to make the controls really operate the system according to advance publicity.

The natural tendency was to apply gravity control hookups to fan systems. Contractors who did the first fan work report systems where the house thermostat opened the draft, closed the check

continued until the bonnet temperature fell to the 15 degrees below setting when it shut down. In the meantime the room thermostat might have been satisfied before the fan shut down with the result that the room temperature was over-run.

A questionnaire mailed out to AMERICAN ARTISAN readers about this time showed that fan settings from 110 degrees to 250 degrees were being used and, of more importance, that at least 95 per cent of the contractors did not know why they were using any particular pair of settings.

This combination of room thermostat and bonnet fan control



How Braley & McLaughlin Merchandise Furnace Cleaning

THROUGHOUT the past year, Braley & McLaughlin, Providence, R. I., heating engineers, have put on a successful campaign to sell furnace cleaning as an activity by itself. Sales from this service have been gratifying, and the contacts have resulted in sales of heater parts, thermostats, humidifiers, and several entire heating jobs, which has made the activity decidedly profitable.

Throughout furnace cleaning time, a sign announcing this cleaning service hangs in a prominent place in one of the two large display windows of the firm's office and salesroom where it may be seen by thousands of motorists and pedestrians who pass weekly. This serves as a silent salesman and reminder.

Their main campaign for this activity is launched during May when about 5,000 announcements are sent

by mail to all names on their mailing list. These names include largely former customers, but also names of prospects or others whose heating apparatus they have had occasion to discuss at some time or other. Because only those who have heaters are prospects for cleaning service, Mr. McLaughlin confines his outside publicity to this direct-mail campaign issued once a year.

The Mailing Piece

The mailing consists of a postal card carrying the announcement and an attached postal for return by the prospect. While last year's return postal carried the regulation government one cent stamp, those of the present year are "business reply postals," the postage to be paid only on those returned to Braley & McLaughlin which, it is expected, will

reduce postage costs.

The mailing covers the usual territory of the firm, including south and southeastern Massachusetts, eastern Connecticut and Rhode Island.

The message on the past year's announcement reminded the home owner that the heating system should be cleaned of soot and examined for breakage of cement, possible breakage of parts and leaky smoke pipe. Signature on the return card ordered the cleaning service with the printed stipulation that estimates for any additional work were to be given for the approval of the home owner.

Approximately 10 percent of this mailing of 5,000 come back with orders for cleaning. "One advantage of this type of work," says Mr. McLaughlin, "is that it comes in fairly uniformly from May until late Fall with some orders through-

PROVIDENCE, R. I.

166-170 ABORN STREET

BRALEY & McLAUGHLIN

THIS SIDE OF CARD IS FOR ADDRESS
REPLY CARD

BRALEY & McLAUGHLIN
166-170 ABORN STREET
PROVIDENCE, R. I.

Your Heating System should be cleaned and examined after the heating season. Soot, breakage of cement, possible breakage of parts, and leaky smoke-pipe are injurious to health and costly in fuel.

Prices are lower now and parts can be secured quickly.

Let us do this work for you NOW and secure your Comfort with Economy next Winter.

BRALEY & McLAUGHLIN

out the winter. Most of the orders come in the Fall." Because of this uniformity of orders and because they are usually short jobs, they can easily be handled to increase profits. For instance, on an afternoon when an installation job cannot be well started, one or two of these cleaning jobs can be worked in. There are other instances when two or three hours of otherwise idle time can be converted into a profit by one of these cleaning jobs. They help in large measure to make the mechanic's time 100 percent productive.

"While a return of 10 percent on this direct-mail campaign doesn't seem very large," comments Mr. McLaughlin, "it actually gives us a good profit and means considerable yearly volume. Besides the cleaning which is entirely a service proposition, no stock being used, there are minor repairs for which labor and stock are needed. These

Above is shown two sides of the return card mailed out once each year to some 5,000 prospects. Below is the return request for service. Most of the people receiving this card are customers, owners whose plant has been inspected, or people the firm knows something about

minor repairs include new grates, dampers, smoke pipes and other parts needed less frequently. Then there are frequent sales of new accessories such as thermostats and humidifiers, and occasionally there are orders for entire new installations directly resultant from this activity. There are times when an inspection of a heater proves it is beyond repair or is, at least, beyond continued efficient operation even if repaired temporarily in which cases we try to sell a new heater installation.

"This campaign also maintains a yearly contact with our customers, keeping our firm name before them. And our visit brings in leads which the home owner or the housewife give us—a married brother who is having trouble with his heater, a neighbor who has mentioned having his furnace cleaned, a friend who is planning to have thermostatic control installed before he starts his heater next Winter. And these leads are very nearly 100 per cent productive of some sort of work or stock.

"There seems to be but one discouraging angle in this activity. In this city, as I presume in others, there are coal companies which offer cleaning service as a means of selling their coal. Some of these firms make a charge of three dollars for cleaning, but there are others

(Continued on page 20)

BRALEY & McLAUGHLIN

I wish you to clean and examine my Heating System and renew smoke-pipe, if necessary.

I understand that you will submit estimate for any additional work that may be advisable.

Tel. _____



Aigner conducts a typical small city sheet metal and furnace shop. And, of course, he will tackle anything made in metal. The beer cooler which he designed for the tavern trade is shown below. The complete unit is fabricated and assembled in the shop and delivered ready for icing

Aigner, of Waukegan, Finds Profits in Beer Coolers and Washers

"HOW can I cash in on the beer business," the question being asked on every hand these days, finds an excellent answer in the area around Waukegan, Illinois, in the operations of the Aigner Sheet Metal Works, a firm which laid its plans for getting business before the actual return of beer and before most men realized there is money in beer.

These plans consisted of a survey of the dispensing situation and a very good analysis of the type of equipment which would be required by the hundreds of agencies taking on the sale of beer.

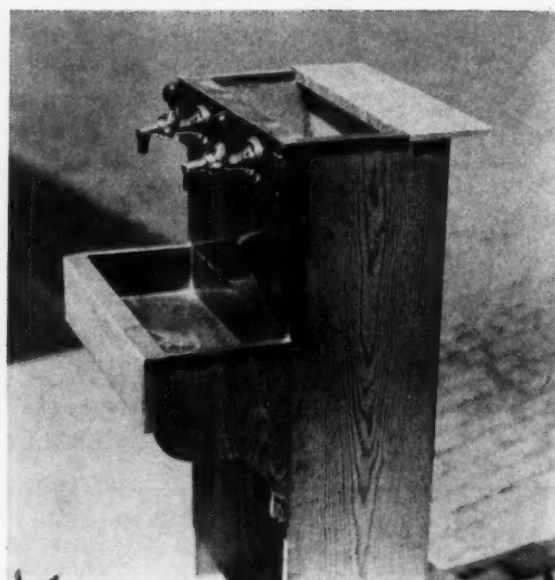
Joe Aigner, owner of the shop, made the survey and determined that beer would be sold two ways—first as a bottled product taken home or served, and second as draught beer to be consumed on the premises. For the first agency about the only work he might hope to get would be the relining or fabrication of ice cooled storage cabi-

nets or the repair of old equipment.

But for the draught beer he decided that there would be two general types of dispensers. The first would be the large restaurant or tavern where elaborate fixtures and expensive mechanical equipment could pay for itself through volume sales.

For this class of establishment the relining and repair of old bars and cooling equipment would offer a good field and plans were laid to make the Aigner firm known to these prospects.

The biggest field, however, seemed to be the dozens and dozens of small taverns, road houses, road side stands, small restaurants and soft drink establishments which would sell draught beer, but would probably not have enough daily volume to warrant the investment of

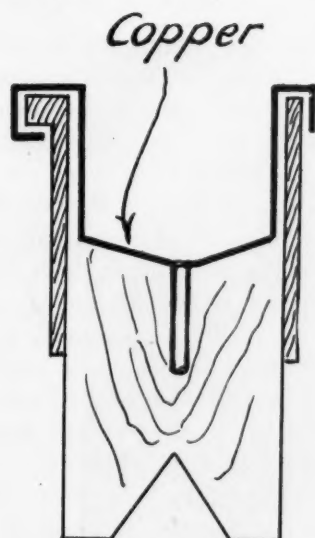


hundreds or thousands of dollars in mechanical cooling and service equipment.

Further investigation showed that a relatively low priced cooler and such supplementary equipment as washing sinks and drains could be fabricated at prices which bring a good profit.

After looking over the existing equipment and rejecting several designs because of expensive fabrication or costly assembly a line of inexpensive units was designed and put into production. The appearance of these units is shown in the photographs.

The big seller, of course, is the cooler. Every dispenser of draught beer must have a cooler. This particular cooler is built on a wood frame. The legs and side are one piece of 1-inch lumber. The back

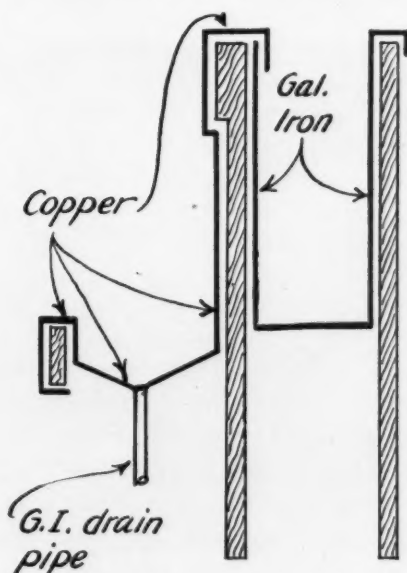


consists of $\frac{1}{2}$ -inch boards nailed across the legs. The support for the drain pan is also wood with a wooden front and base under the copper pan.

The face of the cooler and the drain are covered with copper as shown with the drain pipe taken through the center of the drain and left open for connection to a hose or a pail. The copper face is carried over the front part of the top for appearance and is nailed along the sides as shown. Other materials such as aluminum or the stainless steel can be used.

The cooling box is insulated with a slab of cork and lined with galvanized iron with all corners soldered to make the box water tight. Ice is packed around the coils letting the ice water seep through to the center of the coil.

Two faucets are used on the



The three drawings above show cross sections of the cooler (center) and the washer (right and left)

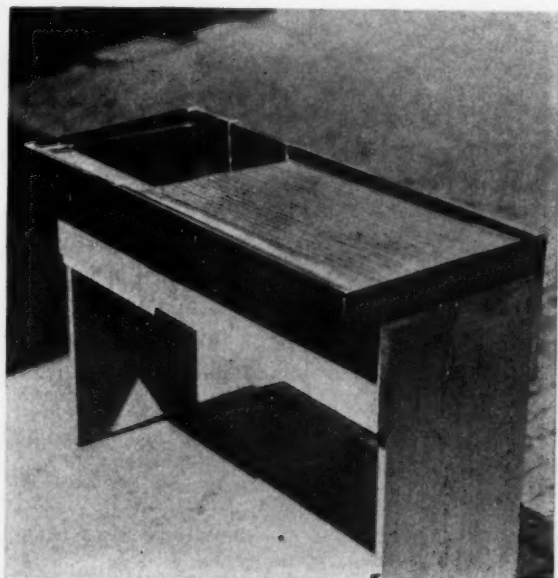
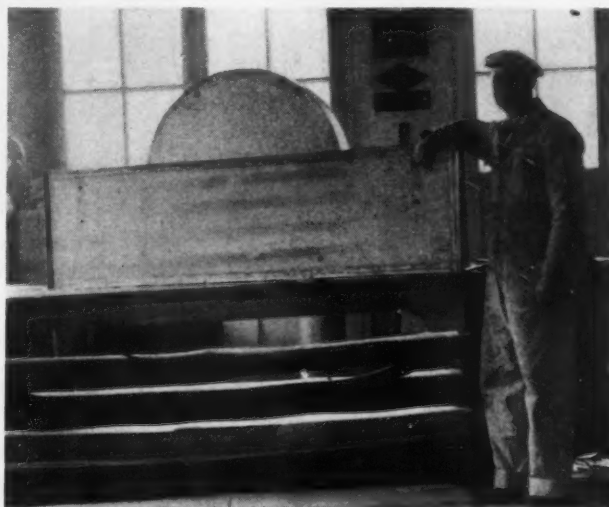
standard cooler. Each faucet is connected to a block tin coil 30 feet long coiled about 6 inches in diameter and placed upright in the cooler. The lower end of the coil has connections outside and underneath the cooling box for connec-

tion with the line running to the barrels.

For the standard, two-faucet cooler, the following materials are required—two faucets; two 30-foot coils of $\frac{3}{8}$ -inch, 5 ounce block tin pipe; two union connections for the coil; 12 square feet of 16 ounce copper, stainless steel or aluminum; several board feet of lumber for the frame; about 20 square feet of insulation.

The second unit developed by

Right—Joe Aigner, proprietor, standing beside a metal sign he is assembling for a Neon lighting company



Left—The washer is a simple affair with a corrugated drain and a sink with a drain pipe on a lumber frame. One man can move either unit. Simplicity of design assures low sales prices

Aigner is the washing table. This unit is also built upon a 1-inch lumber frame as shown in one of the photographs. The wood frame consists of the two ends which also serve as supports, a front and back apron and a wood top which supports the metal sink and drain.

The photographs show the construction as the washer looks when ready for installation, while the cross sections show the method of assembling wood and metal. The

**BAR
SUPPLIES**

Copper and Brass Work
Drip Plates — Coil Boxes
Rinse Tanks — Novelty Boxes

**AIGNER SHEET
METAL WORKS**

Phone Maj. 4111
666 Kennard St.
Waukegan, Ill.

Above is the advertisement run in the newspaper during the seven days preceding the sale of beer

sink is copper lined with all joints soldered, of course, and the bottom pitched to the drain pipe toward the back.

The drain board is pitched to the sink and is corrugated as detailed.

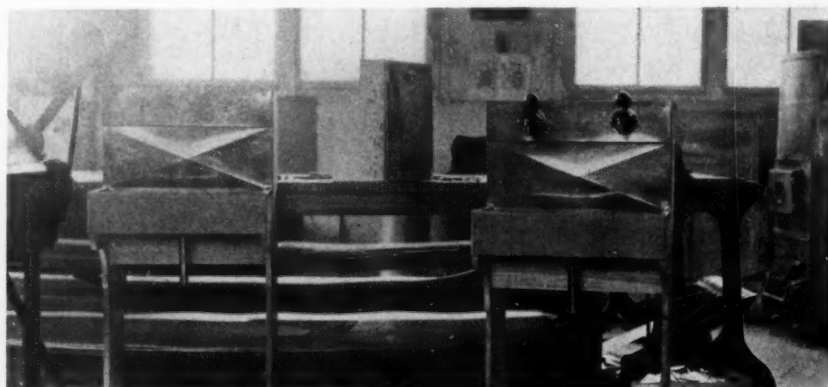
When the units had been designed and the first ones made up a small newspaper advertisement was run for seven days during the week preceding introduction of beer. This small advertisement brought so many buyers that cars were usually standing out in front of the Aigner shop waiting to pick up the units while other customers insisted on night shifts so their units could be in operation on the first day.

Before the end of the first month more than two dozen coolers and as

many sinks were sold and delivered. No additional advertising has been required since and still orders are on hand for several units. In addition, sample units are on display at a local malt shop located in the main business district.

Just as soon as this first rush is over the firm intends to make a canvass of all the roadside shops and stores around Waukegan and take a sample along to demonstrate.

In addition to this work of making and selling small coolers, the Aigner shop has also been busy with repair work on large bars and has also had some work in local breweries. For the summer picnic business, which used to be good in preprohibition days, a small portable cooler with 25 feet of coil, a hand pump and one faucet is being experimented with.



Lined up here are a pair of two-faucet coolers and a picnic cooler now in production for summer business. The picnic cooler is wood and cooper with a 20-foot coil

Braley & McLaughlin Cleaning [Continued from page 17]

which offer free cleaning, giving decidedly unfair competition to heating engineers.

"I am a member of the Rhode Island Anthracite Club, and one of the things I am working for is an agreement as to a charge for cleaning. Understand I cannot object to coal companies doing cleaning, but I do think they should make a fair charge for their work which would be entirely fair to all concerned. Several companies are willing to enter such an agreement, but others insist upon their rights to offer free service if they want, their aim be-

ing to invite coal sales through this activity. I believe in the future some agreement will be made, but many such changes must come about by continued agitation and understanding.

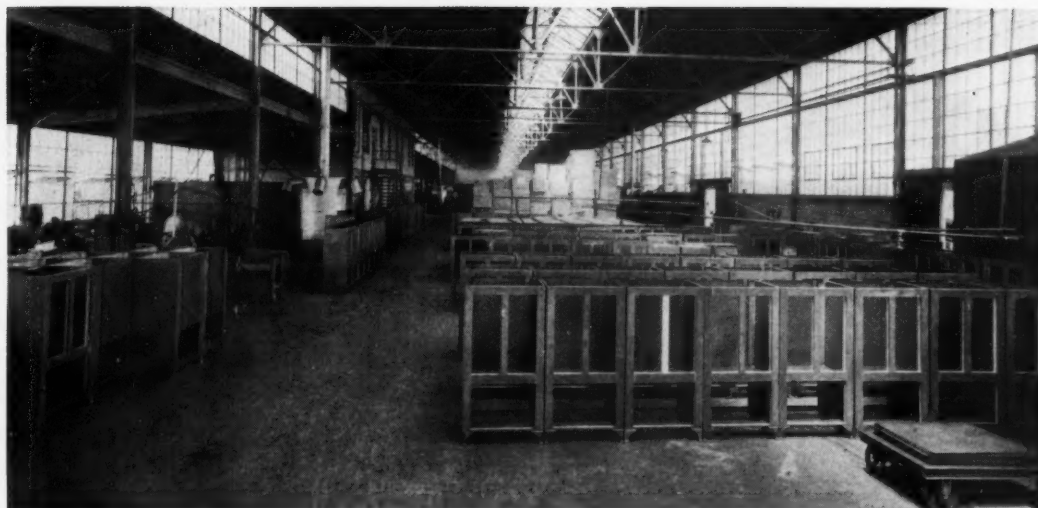
"Another angle to this free cleaning service is that the job is often done improperly, failing to give the home owner the satisfaction a cleaned heater should give. This sours the home owner on cleaning; in other cases, it arouses a desire for proper cleaning. We have been called several times to do cleaning jobs supposed to have been done by

"This beer business," Joe Aigner says, "is still in the experimental stage. Sellers don't know exactly what they need for today's business and they don't know what will be needed some months hence. The big fellow will, of course, buy mechanical equipment in high class service units. The little fellow, who still doesn't know how much trade he can hope to get or how long his volume will hold up, wants reasonably priced equipment and this is what we aim to give him.

"The future sale of beer equipment is still somewhat uncertain. In order to get information about our units to the prospects I have made arrangements with some of the beer salesmen to talk up our units. This has brought some sales at a low sales cost, highly essential with a low priced unit like ours."

coal companies offering free service, and none of them have been done properly.

"But, generally speaking, furnace cleaning gives a profit, both in itself and in the business it leads to. The tendency of the home owner today is to hire this type of work done, whereas a few years ago, the man would undertake to do this himself. Another element in its favor is that home owners demand faultless performance of their heaters, and they realize it must have at least an annual cleaning to accomplish this."



The assembly corner of the Wepsco shop where beer coolers are assembled

The Large Fabricator Is Also Finding Beer Dispensers Salable

ALMOST overnight the American metal working industry has awakened to the fact that the advent of beer has opened up a tremendous field for the fabrication and sale of draught beer dispensing equipment.

The manufacturer of sheets, of beer equipment, the large fabricator of sheet metal specialties, the architectural or ventilation sheet metal contractor with power equipment, the small contractor with a three man shop—all have found a market for their products in the beer field.

The sale of draught beer has brought to the manufacturer's and fabricator's door a flood of orders for beer dispensing equipment so great that even the smallest of sheet metal shops have found a ready market for the simple cooling units which can be fabricated on manually operated machines using wood framing as the support for the metal facings and linings.

The larger fabricators, equipped with power machines, have found their market among the buyers of furniture finished, refrigerated or iced units where appearance is of vital importance. These larger

shops have worked out their designs and fabricating operations so that steady, production line manufacture can be followed.

The types of units now under manufacture by these larger shops range from small, one door iced coolers to lengthy bars containing storage space, either ice or refrigeration cooling, washing sinks and drain boards, and equipped to take any type of pressure system. These units range from around one hundred dollars in cost to several hundred dollars and are being manufac-

tured in a variety of finishes, materials and designs.

In the Chicago area the Wepsco Steel Products Company of Blue Island and Chicago, have established sufficient demand for their beer coolers to devote a section of their shop production equipment to the fabrication of parts and assembly of beer dispensers.

The Wepsco company did and still does make a variety of metal equipment such as electric refrigerators. The shop has all the power equipment to form metal sections of all sizes and types and other departments are specialists in metal finishing, frame assembly and insulation application. It required little change in production plans, therefore, to enter the beer cooler field with a line of units priced and sized to meet every need.

These coolers are of two general types—ice cooled and refrigerated. Production starts with the assembly of the wood framing while the metal forming departments are getting out the tops, fronts, sides, back, the interior sections such as liners, trays, racks, slides and door sections. All of these sections are

(Continued on page 28)



A typical small electrically refrigerated cooler



How Duct Work Was Scheduled on Louisiana's New Capitol

BECAUSE of the intricate details of the ventilating system of the new Louisiana state capitol building, the Holzer Sheet Metal Works, New Orleans, ventilating contractors, adopted a simplified and accurate method of interpreting the mechanical plans. Upon receiving blue-prints of the ventilating system, the contractors divided the entire system into individual units. Each unit was separately traced from the architect's plans.

Each tracing consisted of the unit fan or fans and all the duct work connected with it, designating grilles, dampers, splitters, and all other mechanical devices related to the duct work.

Once the tracing was made, the duct work on the sheet was marked off into items, each item being an individual section of the duct work as it was to be fabricated in the shop. The items were numbered, as Item 1, Item 2, Item 3, and so on. The gage,

size and length of each item was marked on the tracing, along with its number.

On one blank section of the tracing sheet a schedule was marked off. All items were transferred to this schedule and designated as: Item 1, its gage, size, length, weight per linear foot, and total weight per section as shown here. After each item had been scheduled in this manner, the total weights of each gage of metal used in the entire unit

SCHEDULE FOR ANGLES AND INSERTS TO BE USED IN ERECTING DUCT WORK ON THE SAME UNIT

Schedule No. 1—(Braces)

ITEM No.	SIZE Ls.	WEIGHT PER LINEAR FOOT	LINEAR FEET	TOTAL WEIGHT	No. OF INSERTS
1	2x2	1.65	14	23	4
2	2x2	1.65	10	16.50	3

TOTALS

SCHEDULE WORKED OUT FOR FLAT SHEETS ON TRACING OF ONE UNIT

Schedule No. 1—House of Representatives Unit

ITEM No.	GAGE	SIZE OF DUCT INCHES	LENGTH OF DUCT IN FEET	WEIGHT PER LINEAR FOOT	WEIGHT PER SECTION PER GAGE				
					18	20	22	24	26
1.	18	120x18	32.0	54.97	1759				
2	26	18x14	4.0	4.90					20
3	24	28x18	11.6	9.10				100	

Total weights of each gage of sheet for entire unit

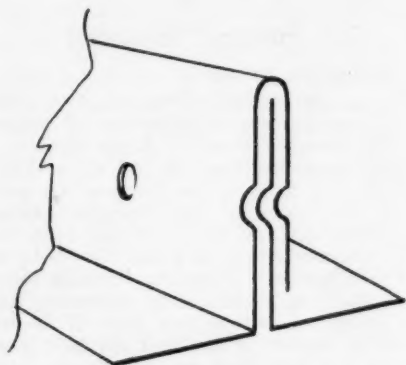
Above are small sections of the schedule sheets used so advantageously for the large duct job described. Full explanation is given in the text

were determined by adding each column of weights marked on the schedule. This simplified the job of estimating material costs and insured accuracy.

Estimating the Sheets Needed

Determination of the quantities of flat sheets of various sizes required for the unit was accomplished by working out each item on the schedule sheet, designating the number and sizes of sheets required for each item on the tracing. As this was done in the contractor's office, much time was saved by shop mechanics while fabricating the duct work, and by carefully determining the sheet sizes for each item, waste of materials during fabrication was reduced to a minimum.

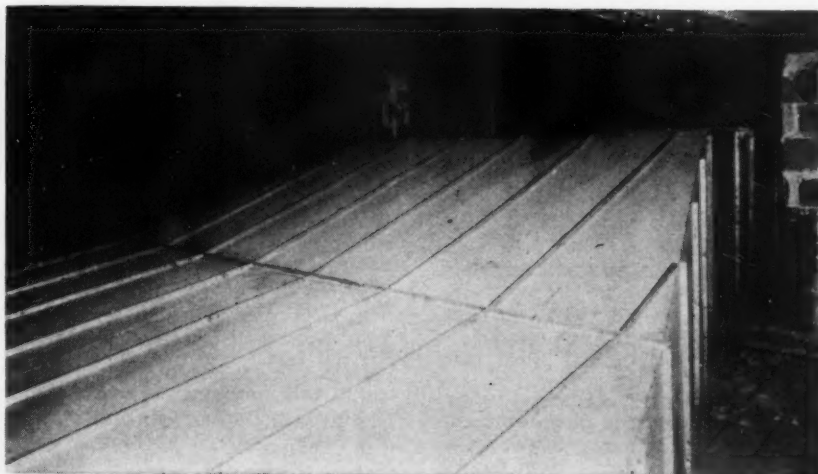
An additional schedule was worked out for hanging and bracing all duct work. This specified the corresponding number of inserts, hangers, and angle iron



The seam construction is shown here

braces required for each item scheduled, as well as the number of linear feet and the weight of the various angles. Over 150,000 lb. of galvanized sheet metal were used for the ducts and other parts of the system.

Thus, when the two schedules on each tracing were completed, the sheet metal contractors had an exact record of all materials required for the unit: sizes, lengths, gages, weights and quantities. The tracings and accompanying schedules served not only as the base from which the



This view and the photograph on the preceding page show typical duct construction with the extended stiffeners for the hangers and the stiffening seams

proposal could be made, but, when the contract was awarded, they proved valuable as shop details for the fabrication and erection of each unit of the ventilating system.

The Holzer company also supplies some interesting sidelights on their installation methods. Despite the size of the job, all materials were cut and fabricated in the field. As the duct sections were being fabricated, the branches and take-offs were properly spotted and laid out along the line and cut out in the flat sheets before seams were formed.

Sections were made in 30 and 36-inch joints and assembled in 8 or 10-foot lengths according to conditions at the point of erection. All seams used are standing seams, buttoned and riveted as conditions specified. A detail shows a typical seam. Stiffener angles were spotted at turns and frequent intervals. The stiffeners were extended beyond the sides to provide a connection for the $\frac{5}{8}$ -inch rods used to hang the lines. The floor construction is hollow tile, so the rods were cut through the tile and bent over to hook with the concrete floor slab. A 10-gage plate spreads the pull under the crook of the rod.

System Described Briefly

The 33-story capitol building is situated in Baton Rouge; at its base it covers an area of over

45,000 sq. ft. and its height is 400 ft.

As certain ventilated sections of the structure are unoccupied at times, the air-conditioning system was designed in individual units. Each unit is equipped with air filters. Cleaning of the filters is automatic; when the fan of the unit is shut down, the deceleration starts a motor which operates a washing and cleaning unit in the filter apparatus.

The 25th floor (which includes the judges' offices) is cooled by means of conditioned air forced over automatically-refrigerated coils. The dining room and cafeteria in the basement are cooled by unit coolers suspended above the ceiling and discharging to the rooms through a series of distributing ducts.

The exhaust system for the entire building is one unit. Air is pulled into unit ducts and from them to branch ducts that lead downward to the sub-basement, where all are joined in the main exhaust duct, approximately $6\frac{1}{2}$ ft. high and $12\frac{1}{2}$ ft. wide. Air is expelled from this main duct from a passage that runs under the long, sloping stairway that leads to the front entrance. All duct work was paneled. A deodorizing machine installed at the exit of the main exhaust duct eliminates unpleasant odors from the kitchens, toilets, dining room and cafeteria by means of electrically-produced ozone.

.. the problem corner

Chimney Down Draft

American Artisan:

I would like to get some suggestions for remedying a down draft in a chimney. This chimney top sets on a low, one-story building. Next door on one side is three story building, about 20 feet away. On the other side is a two-story building, about 45 feet away. The front and back of the building on which the chimney is located are clear.

The chimney tile is 12 inches in diameter. There is one 8-inch furnace pipe and one 6-inch laundry stove (with damper) using this flue.

The trouble is most pronounced on windy days when the wind seems to come down off the three story building into the chimney causing a troublesome down draft. Sometimes there is a regular whirlwind between the buildings above the chimney.

The draft is not too good at any time, but if there was no down draft the chimney would work satisfactorily.

My idea is some sort of a top which would draw, would not catch soot, and would keep air from going down the chimney.

F. K., Michigan.

Reply by

P. H. Cotten, New Orleans

I note that F. H. of Michigan requests information on chimney caps that will cure a down draft. I can furnish him with an 8-inch diameter chimney cap which I have invented and used with success on all kinds of chimneys and vents when down drafts gave trouble.

The cost of the cap is very low and if it does not cure the trouble he can send it back and I will refund his money.

Reply by

Drummond Sheet Metal Works,
Wichita, Kans.

We see in the ARTISAN an F. K. in Michigan who has a problem to stop the down draft of a chimney. We have solved this problem for some time with a ventilator which we manufacture for the trade.

We guarantee no down draft anywhere as long as the ventilator is out of doors. High buildings next to the building with down draft have never kept our ventilator from working satisfactorily. We will be glad to tell this reader all about our ventilator if he wants to write us.

Tinning Milk Vats

In the January issue, R. C. L., North Dakota, a reader asked how to tin a large milk vat. Some suggestions were published, but here is another sugges-

tion from a Chicago reader, A. E. Klatt. Mr. Klatt says:

"In the January issue of the American Artisan I note your inquiry regarding tinning of milk vats.

"As a specialist in this line, with years of practical experience in tinning dairy equipment, I believe I am able to give you the right information.

"According to your writing this seems to be a 400 gallon vat. U-shaped vats are manufactured by Cherry-Burrell, Jensen, or Manning Co. and are easy to retin. After removing the coil the first step is to remove all solder from corners and seams. Then clean the copper with muriatic acid and No. 3 steelwool. In most cases cleaning must be done twice or three times. After last cleaning do not wash with water, but wipe dry with waste. Apply cut acid at once all over and start tinning.

"Tinning is done best with a wide flame torch, heat the copper, apply tin. Be sure to use pure block tin and rub on with No. 3 steelwool.

"After you have tinned the entire surface, heat over the same way and use clean waste for wiping. Wipe off surplus tin and particles of steelwool and you will have a smooth, bright tinned surface.

"For soldering, use a small torch and where milk comes in contact with solder not heavier than 50/50 should be used. These vats like all dairy equipment must stand government inspection and material should be used according to specifications."

B. t. u. Values

American Artisan:

Will you please furnish me with data on the B.t.u. values for the following woods used as fuel? We would like to compare these woods with coal and oil. In this part of the country more wood is burned than coal or oil. The woods are hard maple, soft maple, birch, oak, white ash, black ash, hemlock and pine.

Reply by
The Editors

The B.t.u. values for various kinds of wood as compared with coal and oil are as follows:

1. Hard maple, 8,000 B.t.u. per pound.
2. Birch, 7,958 B.t.u. per pound.

3. Oak, 8,112 B.t.u. per pound.
4. Ash, 8,210 B.t.u. per pound.
5. Hemlock, 8,000 B.t.u. per pound.
6. Pine, 8,176 B.t.u. per pound.
7. Black ash, no data.
8. Soft maple, no data.

These properties are compiled from various government publications and are for kiln-dried woods.

If the wood is air dried deduct fifteen percent. If the wood is green deduct twenty-five to fifty percent depending upon the state of dryness.

It is practically impossible to give you any actual analysis of the coal B.t.u. content without knowing just what type of coal you commonly use. We might suggest that you use the content 13,500 B.t.u. per pound for anthracite coal and 14,000 B.t.u. for bituminous coal. These may vary several thousand B.t.u. per pound according to the coal.

We shall be glad to give you specific heat content if you will send us the name of the fuel and the location of its mine.

Furnace Formula

American Artisan:

In my studies of the standard code governing the installations of warm air furnaces I am in doubt regarding the appliance and method of working out the formula for furnace rating.

For instance the formula states either add or deduct 2 per cent for each unit above or below 20. How is this applied? Also the formula gives 136 B.t.u. as the heat delivering capacity of one square inch of leader pipe, assuming one half the heat goes to the first floor and half to the second floor. Will the delivery value be changed when all the heat is sent to the first floor?

W. A. K., Illinois.

Reply by
The Editors

As you no doubt know, the furnace rating formula is based upon the assumption that one-half of the air supplied by the furnace will be used on the first floor and one-half of the air will be used on the second floor at 175 degree register temperature.

The formula is also based upon a ratio of 20 to 1 for heating surface to grate surface. This ratio is used because most furnaces employ this ratio. The table you refer to is for correcting the formula where the heating area is more or less than the standard ratio of 20 to 1. The correction is made by adding or deducting two percent for each unit above or below twenty. From your letter we take it that you understand the formula this far. What you are probably confused about is

the factor 1.75 G. This factor, 1.75 G, is derived from a rather lengthy formula as follows:

$$\frac{\text{"Square inches of leader pipe supplied"} = (0.75 \times C \times G \times F \times E)}{136} \times [1 + 0.02 \times (R - 20)]$$

in which:

0.75 = an average value for the fraction of the heat available at the furnace which is actually delivered at the registers.

G = grate area, square feet.

C = combustion rate, pounds coal burned per square foot of grate per hour. This depends on register-air temperature desired, and for a register-air temperature of 175 deg. Fahr. is 7.5.

F = calorific value of fuel as fired, B.t.u. per pound.

E = efficiency of heater, or heat available at bonnet divided by heat available in fuel, which at 175 deg. at the register is approximately 0.55.

R = ratio of heating surface area (exclusive of ashpit) to grate area.

0.02 = the amount of increase or decrease in rating for each unit in the value of R above or below 20 (as the case may be).

136 = B.t.u. carrying value of 1 in. of pipe in an average installation assuming half of the heat is delivered to first and half to second story rooms. (Corresponds to a register-air temperature of 175 deg.)

In Supplement Bulletin Volume 1, No. 4, National Warm Air Heating Association, the above formula has been applied, by Professor V. S. Day to two series of furnaces, of the cast-iron circular and steel crescent-radiator type, respectively. In this application, values for F and E which were found in the test at the University of Illinois were substituted and thus the above formula reduced to:

$$\text{Square inch leader supplied} = \frac{0.75 \times 7.5 \times G \times 12,790 \times 0.55}{136} \times$$

$$[1 + 0.02 \times (R - 20)]$$

or square inch leader pipe supplied = 292 G [1 + 0.02 × (R - 20)]

The number 292 G will be obtained by multiplying and dividing according to the last formula above. In standard code application 292 is reduced to 252 to allow for less efficient operating conditions to the extent of 15%.

The number 252 is then divided by 144 (the number of square inches in a square foot), to give 1.75.

If you are supplying all of your air to the first floor you must change the number 136, which appears as the divisor in the formula, to 111, which is the B.t.u. carrying capacity of one square inch of leader pipe to a first floor register.

We suggest that you either work the formula out or send us the num-

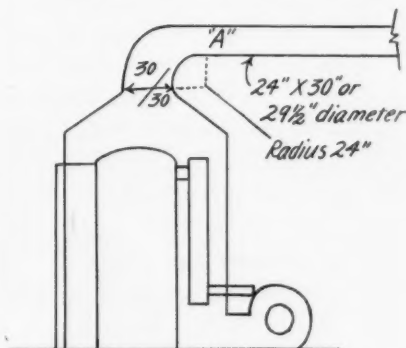
ber, type and size of furnace and we will be glad to work out the formula for this furnace for you.

Figuring Total Loss

American Artisan:

I have been following your engineering articles in the Artisan for quite a while and one point which seems quite important is not yet clear to me. Quite often you have shown the total loss through an entire system, this being sum of the losses through the heater, filters, registers, warm air and return air ducts and I believe you state the fan will be selected with a rating equal to this total pressure requirement. If we lose through these various parts of the system a total equal to the rated capacity of the blower it has seemed to me that no pressure would be noticeable at the register face. In other words we have just enough pressure to get the air to the grille and no farther.

Perhaps I have confused total pressure to mean velocity pressure plus static pressure when you referred only to total static pressure. I know manufacturers' ratings on fans sometimes state "to deliver say 5000 c.f.m. against a maintained resistance of 1/2-inch S. P., other data being 450 R.P.M. and velocity at mouth of fan 1200 f.p.m.



Fan: 5000 C.F.M. Vel: 1200 F.M.
S.P. 1/2" Loss thru heater .05

I have tried to reason that from this velocity of 1200 f.p.m. at mouth of fan that a certain velocity could be assured at the register. If I am right on this point please advise me.

In the accompanying sketch with data as noted what would the velocity in the main be at point "A," also what portion of the 1/2-inch S. P. would remain to be used in designing the remainder of the duct system? Formula for these points would be appreciated or refer to Allen & Walker or A. S. H. & V. E. Guide as I have both volumes.

I would appreciate a reference in which I can find method of extracting fifth root of a number as you used

this in a formula once. I can find square root, cube root and fourth root but none beyond that.

C. L. T., Iowa.

Reply by
Platte Overton

Referring to your question regarding total loss through filters, registers, heater, ducts, etc., we would refer you to the article entitled "Where and What Is Friction," published in the March 28, 1932, issue of AMERICAN ARTISAN. This question is answered on the second page of the article and begins "The question:—etc." Our volume is constant and if the velocity is 500 feet per minute in the duct our velocity will be the same at the open end of this duct unless we alter the area of the opening. If we increase the area the velocity will drop. If we decrease it the velocity will increase. Thus, if our open end were 1/2 the area of the duct our velocity at the open end would become 500 times 2 equals 1,000. No doubt such an outlet would increase the over all pressure loss.

Referring to your sketch with the 5,000 c.f.m. fan with an outlet velocity of 1,200 f.m., we will assume that we have constant volume or in other words we are not heating the air with the furnace. If, under these conditions we have the fan delivering 5,000 c.f.m., we must of course have 5,000 c.f.m. in the duct at the point "A." A duct 24 x 30 is equal to 5 square feet, thus 5,000 divided by 5 equals 1,000 velocity at "A."

If the system is designed for 1/2 inch pressure loss and the loss over the heater is only .05, the remaining pressure (.5 — .05 = .45) may be used in the design of the duct system. You do not suggest any return piping but if there is any this must be counted as part of the duct system. In many cases there will be a loss at the fan inlet even if there is no return piping. Much depends on where the fan is placed, size of fan room, openings to fan room, etc.

A quick and easy method of extracting the fifth root or any other root of a number is by logarithms. The method is not difficult to learn and a simple book on logarithms may be purchased at any book store. Thirty minutes' work, say for four or five days, and some little practice, will make this method indispensable to you.

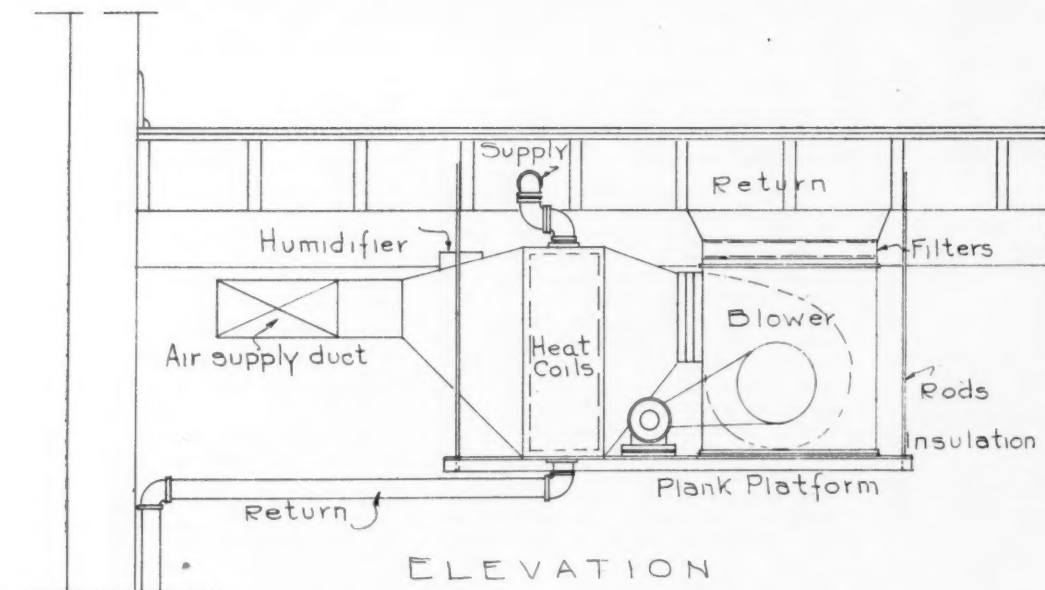
Example: To find the root of a number by logarithms, divide the log of the number by the index of the root. The number corresponding to this log is the required root.

Example: Find $\sqrt[5]{27.658}$

The log of 27.658 equals 1.4418. 1/5 of 1.4418 = 0.2884. 0.2884 in the log tables is equal to 1.943. Thus:

$\sqrt[5]{27.658}$ equals 1.943

Readers are invited to send in solutions or suggestions to the problems presented in this section. We shall also be glad to answer problems whenever we can or submit your problem to some authority for his suggestion.



In steam or hot water systems the fan and heat transfer coils may be suspended from the ceiling, as shown here, or the usual form of floor arrangement may be used. Note the choice and arrangement of apparatus

Conditioning Radiator Heated Houses

By Platte Overton

THE furnace man, ventilation contractor, and sheet metal contractor, are the natural heirs of the new air conditioning industry if for no other reason than that they have always been propagators of an indirect system of heating—the warm air furnace.

It now seems that the above contractors are handicapped by the idea that air conditioning is confined to new buildings, or those that are furnace heated.

The present owners of steam, hot water, and vapor heating systems should furnish some of our best prospects if for no other reason than the innate idea that the owners of such systems have more money. Be that as it may, the fact remains that air conditioning is not confined to furnace heated homes.

Every owner of a steam, hot water, or vapor system is a good prospect and will certainly furnish a considerable field for any ambitious salesman. The question of what to do about getting the business can surely be answered by any good heating man. What to do after the contract is signed is the burden of this article.

The plans shown are of a 17,000 cubic foot house of the "better"

type. This building cost around \$12,000 and has a direct vapor system that cost the owner \$900 in 1928. These owners have been listening for the past three years to air conditioning advertising talks and editorials by Hoover, Babson, Arthur Brisbane and others.

The virus has crept into their

blood and they are looking askance at direct radiators, and they have an irritating feeling that they have not bought the best. They have opened the door to some air conditioning salesman from an alive sheet metal contractor's shop and we now have the plans on the board and must do something about it.

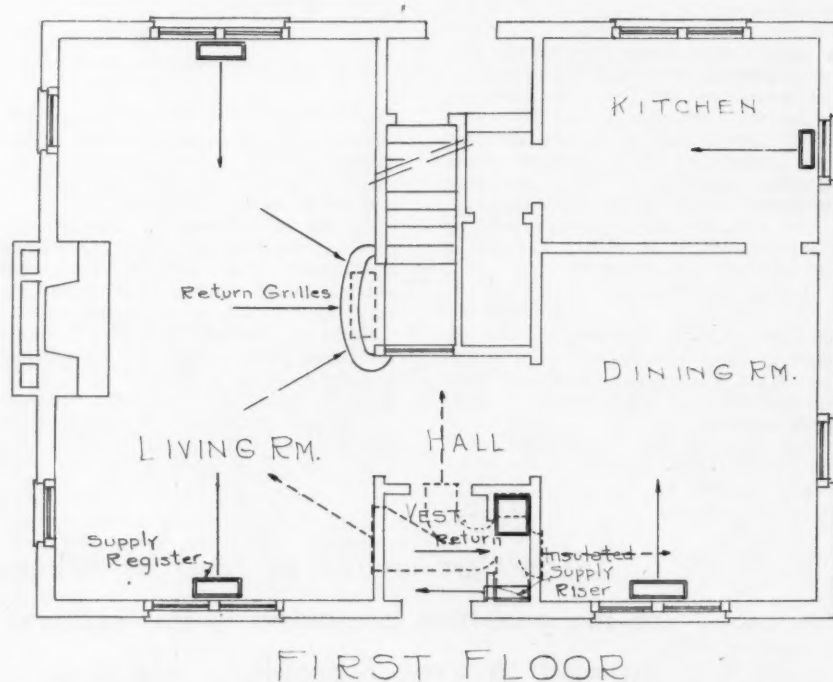
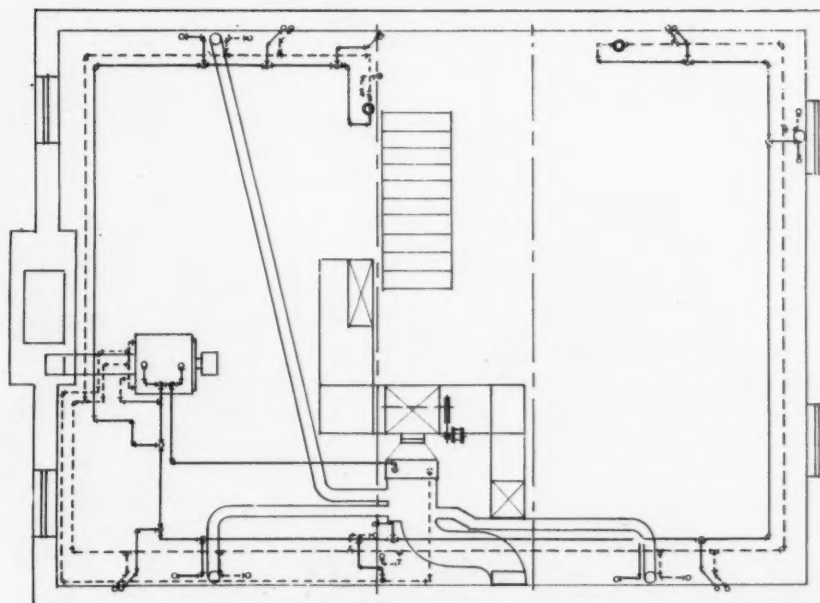


Fig. 1—Three supply systems can be used: remove the radiators and install floor registers; leave the radiators in and place floor grilles under them; leave in the radiators but place inlets in side walls, on other walls, etc.

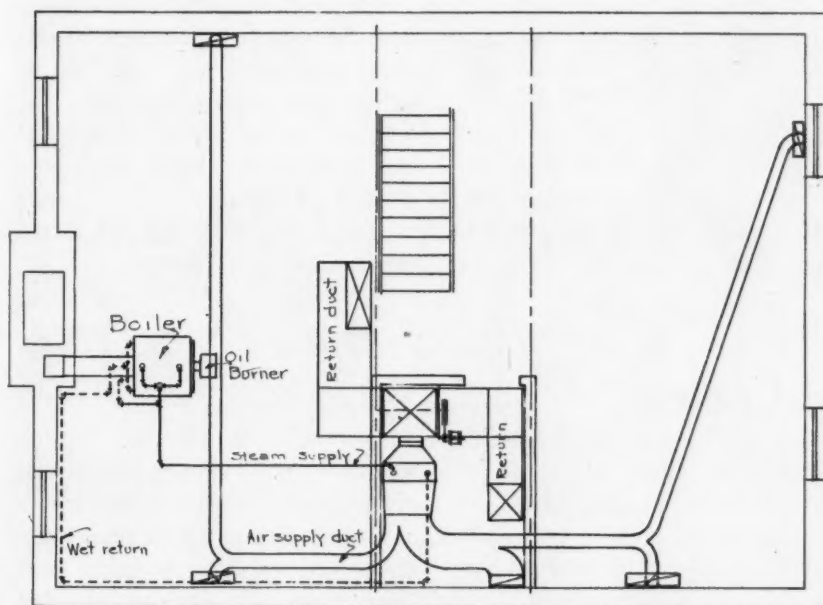
Three solutions are apparent. First, we can leave the radiators in position and initiate conditioned air under them. Second, leaving the radiators in place we can bring in the air from some other position or as shown by the dotted lines in Fig. 1. Third, remove the radiators entirely and install a complete indirect system.

From the designer's viewpoint everything is wrong with this house. It is brick, tile, and steel joist construction. We have practically no chance to use stacks or baseboard inlets. There are 7-inch I beams under the partitions on the second floor. However, the house has the advantage of being well insulated, there are storm windows, and the



BASEMENT PLAN

Fig. 2 (above) and Fig. 3 (left) show two basement plants. In Fig. 2 the radiators are left in place with air introduced under them. In Fig. 3 the radiators are removed and outside wall supply registers substituted



BASEMENT PLAN

total B.t.u. loss is comparatively low. If the reverse were true, I would recommend that the direct radiation on exposed walls remain in place.

Owners of direct radiator systems are not so prone to protest against floor inlets if they are narrow and do not interfere with the rugs. They are accustomed to radiators and a 30x6-inch floor face seems like a small matter to them. Such inlets are shown on the plans, not because they are better, but are due to the insurmountable difficulties of side wall inlets. If the radiation is to remain in place, and

conditioned air is delivered as an auxiliary system, the dotted lines on Fig. 1 show an inexpensive method of inlets. The vestibule ceiling may be furred down and the ducts concealed.

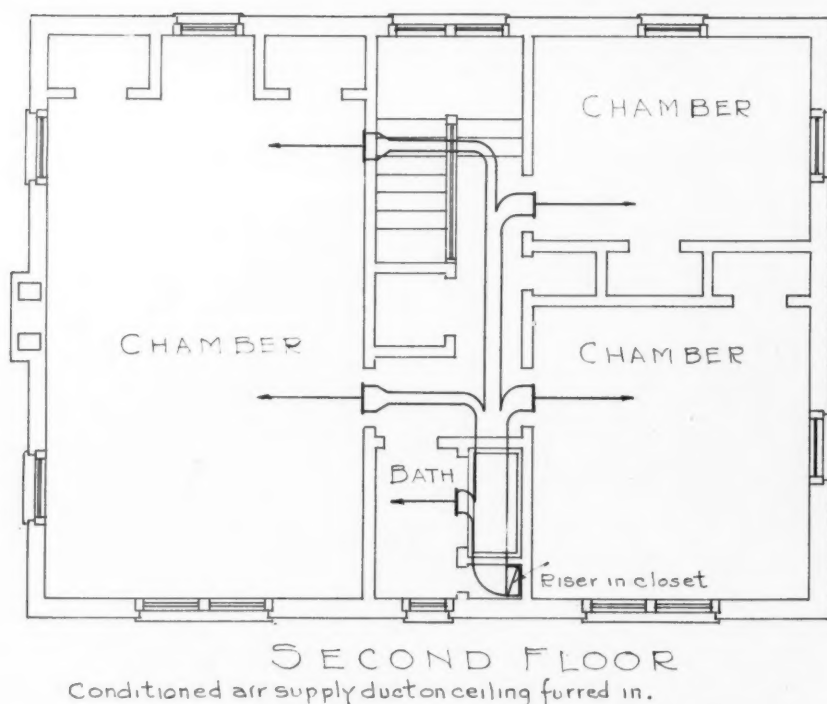
Fig. 2 and 3 are basement plans. Fig. 3 shows the layout for the complete indirect system with all radiators removed, and Fig. 2 with radiation remaining and all rooms but the kitchen air conditioned.

In the case of the kitchen the contractor should advise the installation of an exhaust fan. With the installation of the method shown by the dotted lines in the vestibule the

air should enter the room at a temperature slightly higher than room and if initiated below the radiators room temperature or 70 degrees is sufficient. The radiator controls are set to offset the wall losses.

Where the indirect method is employed, the designers must use extreme caution in his air supply. Furnaces are highly flexible and inlet temperatures from 70 to 250 degrees are possible. However, with steam, vapor, or hot water systems we have another story. With steam at 5 pounds pressure 160 degrees is probably the final temperature at the coil. With vapor at 5 inches of vacuum 150 degrees and for hot water, 150 degrees with 190 degree water. The heating coils must be of ample capacity to deliver the equivalent B.t.u. of the required square feet of radiation for the peak load.

As shown in Fig. 2 it is best to go back to the boiler header and run a separate supply main to the heating coils, with a separate wet or dry return to the return header. The proper length of cooling leg must



In this house all second floor partitions are carried by steel beams. This was solved by bringing the supply up through a closet and placing the main under a furred down ceiling. Branches are brought into the room through the partition above the hall door.

be allowed between the coils and the trap.

Controls are similar to those used on furnace installations. When the

temperature in the house drops below 70 degrees the oil burner cuts in, or draft doors are opened. When steam reaches the coils a hy-

dro switch cuts in the fan and the humidifying spray line, and the system is in operation. The humidistat, however, allows the humidifying spray to work only if the relative humidity is below that called for by the humiditrol and the fan is on.

If the radiation remains in place, a cut off valve may be placed in the radiation supply main from the boiler header. The entire system then becomes indirect. The radiation is always available for extreme sub zero weather. This makes the system extremely flexible, and with a summer switch on the fan gives a ventilation effect of forced circulation in hot weather. If cold water is available the coils may be used as a cooling medium.

The system in Fig. 3 should not cost the owner to exceed \$900 and the system with the radiation retained not to exceed \$700. The heating contractor may subcontract the steam fitting labor after purchasing the material. The ceiling on the second floor may be furred down to cover the ducts.

Large Fabricators Make Coolers [Continued from page 21]



A one-barrel, ice cooled, portable unit opened to show the barrel chamber, coil tray (at top), ice cake shelf and removable water pan. The inside is galvanized iron, the outside lacquered panels, the top Bakelite or stainless steel.

brought together in the shop area allotted to cooler assembly where mechanics put the various parts together and place the insulation and the finished outside sections.

Practically all forming work is handled on power machines. Special dies for the sections used most frequently such as door liners, racks, bottoms, backs, and

exterior panels reduce production cost. Less frequently used sections are formed up in small lots, as needed for the schedule. Sections, generally, are put together before the assembly department is reached.

The exteriors used indicate the variety of buying demand. There are, for example, coolers with stainless steel tops and trim, others with Bakelite tops and stainless steel trim. Still others have a baked lacquer exterior. In the smaller, portable sizes all lacquered exteriors, similar to electric refrigerators and finished in several colors are in production. Galvanized iron is used inside.

The Wepsco units are being sold either direct to dealers or are being sold to ice companies who in turn sell the cooler as a means of building ice sales.



At the left is the Glen Cove office and below the Flushing office of the Kiebitz company. The Glen Cove office has for its patrons estate and single residence owners, while the patrons of the Flushing office are transients, apartment and multiple family building owners



Kiebitz - Roofer and Metal Worker Sells According To Customer's Habits

RECOGNIZING that metropolitan and rural roofing and sheet metal business-getting methods must necessarily differ, Frank Kiebitz & Sons, Flushing and Glen Cove, N. Y., sheet metal contractors for the past 29 years, use widely varying merchandising practices in the two offices named.

The Flushing branch, for example, located within 12 miles of the heart of New York City and in a community approaching 70,000 citizens, finds its customers among apartment house owners, real estate operators, factories, schools and mercantile establishments. The Glen Cove office, some 30 miles distant from the "big city," finds its customers chiefly from private estate owners.

Methods of soliciting business differs in the two branches because prospective purchasers in the city

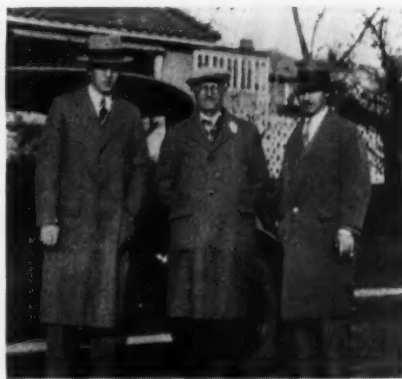
can be solicited without gloves while private estate owners scarcely can be solicited at all except through advertising and architects. It is for this reason that on the main traffic artery leading to Glen Cove Kiebitz & Sons have two large roadside billboards of truly artistic arrangement and appearance. The Flushing busi-

ness is vastly more transient than that of the suburbs. They come and go, the books constantly showing new names. In the outlying section, however, a large percentage of the customer roster comprises 20-year-old patrons.

Most of the advertising done by the sheet metal contractors is duplicated in both places. Daily newspapers, form letters and mailing folders are used in abundance.

The roadside signs referred to are 10 feet high by 18 feet long and are painted in six colors. There is a residence shown on the sign; its lawn is green, its roof red, walks gray and the Kiebitz name in black.

When Frank Kiebitz, the originator of the sheet metal contracting business in 1903, passed on several years ago he wisely delegated his sons to "carry on," placing one in each branch. Emil has the Glen Cove office and Otto that in Flush-



This picture was taken before Frank Kiebitz's death. Left to right are Emil, Frank and Otto Kiebitz—father and sons

ing. Together they make an ideal partnership.

Both offices have desks for outside salesmen. The city men, of which there are 3, contact building contractors, real estate managers, residences and other classes of buildings already indicated. When business is slack they use their autos to drive through the streets on the lookout for defective roofs, gutters, leaders and any evidences of failing metal work. If they see a roof that looks like it should be renewed they stop and canvass the owners. While they do not actually follow the fire engines, when fires occur one of the Kiebitz men drops around in a few days to ask for an opportunity to bid on repairs.

After Kiebitz & Sons have put on a new roof, gutters, flashing, leaders, or installed warm air furnace piping, someone from the office makes a point of returning ostensibly for inspection, but in reality to see if the owner has not some friend or neighbor in mind who needs similar sheet metal work.

There are judged to be few sheet metal contractors who would spend \$300 for photographs of contracts completed and in process. Yet, Kie-

bitz & Sons have done this and made the investment pay handsomely. At each of the offices of the company there is a large photograph album between the covers of which are bound some seventy-five 8 by 10-inch photographs mounted on linen and Holland cloth. There are exterior and interior views, besides quite a number showing how re-roofing is done on the job.

The 150 photographs cost on an average of \$2.00 each, total \$300.00. Seems like a lot of money, but results have justified the expense and will continue to do so as the years roll by.

Roofing is but one division of this contractor's business. Ventilation and warm air heating are other specialties. The Glen Cove office does a large business in metal work for indirect heating by steam and hot water and have put in some very interesting and comprehensive warm air heating jobs.

So good is their reputation that many local plumbing and heating contractors sublet to them duct work on indirect heating and air conditioning installations. There are some 150 towns in the two counties covered, each having two or more heating contractors.

Getting Estate Work

Mention has been made of the fact that the Glen Cove office has its clientele among wealthy estate owners. This requires close cooperation with architects, estate superintendents and highly discriminating owners. The first order is difficult to secure, but once a contract has been finished others are bound to follow provided the workmanship is good and prices fair. Loyalty of owners is in contrast to the changeable tendency characteristic of city customers.

"Many contractors, unfamiliar with country estate business ask us," says Emil, "if the residents are infrequent purchasers. This is not precisely true because many large estates have 25 buildings on them. Resembling small towns in themselves, the manor house usually has a half-dozen or more residences of relatives and dependents. What the owner does the others do likewise, assuming that the principal owner does not order the sheet metal work himself. Consequently, when a firm obtains the good will of wealthy estate owners a dozen such customers are likely to keep orders rolling in."

The Flushing branch of the Kiebitz & Sons sheet metal contracting company often handles large city jobs such, for example, as reroofing a shipping pier of 46,000 square feet, one of their recent jobs, or making a new 3,700 pound smoke breeching for a hotel, another contract. Occasionally there is a new hospital, school or church to be sheet metalled.

Here again almost daily contact with architects and engineers and builders is essential. Otto Kiebitz makes such contacts personally. In the last five years some 47 restaurants have given their work to these contractors. It matters little to the firm whether a dozen coal chutes are to be made or a church is to be reroofed, Kiebitz will do the job no matter where it is located so long as the order is profitable. Roofing, however, is the preferred class of work and that on which the most profit has been made in past years.

"We Were Lucky to Get Out in Time!"

"Firemen say that the roof caught first. My wife, the boy and I were fast asleep. Gradually the smoke awakened us.....Nothing is left now—but we were lucky to get out in 'time!'"

Has experience taught you how disastrous fire can be? No need to wait—when you can have *absolute protection* against roof-communicated fires—by re-roofing with *Johns-Manville Asbestos Shingles*. Even white heat cannot burn them. And they are truly everlasting—proof against rain, wind, sun, snow and ice. Besides, you can choose J-M Asbestos Shingles in a style and color blend that will give your home permanent roof beauty.

Phone us today, and let one of our roofing experts give you complete information.

FRANK KIEBITZ & SONS, INC.
ROOFING & SHEET METAL
ENGINEERS AND CONTRACTORS
 FLUSHING, N. Y. GLEN COVE, N. Y.

This is a typical Kiebitz roofing newspaper advertisement stressing the importance of good roofing. The same advertisements are used for both offices

March 4th Was the Day

that the United States started back UP.

Most of us didn't know it then; with all our banks closed 'n everything, we were dazed for days—but the evidence is now too visible in too many directions to longer doubt.

Co-operation at Washington began looking UP; everybody everywhere started looking UP; wage-scales and payrolls are going UP; farm-produce prices decidedly UP; retail business noticeably UP—

And Now We Rise Up

to remind you that SOMEBODY is going to get some extra sheet metal business soon and it might as well be YOU.

Long-neglected repairs of sheet-metal work on thousands of homes and other structures INSIST on attention NOW—and furnace-cleaning work will secure many repair and replacement jobs that

Will Call for Handy Pipe



We'll ship whatever you need AT ONCE—Remember: Legislation at Washington may affect prices at any time.

F. Meyer & Bro. Co.
PEORIA ILLINOIS

For BEER COILS

Use
EAGLE
Block Tin Pipe

TESTED UNDER **200** POUNDS PRESSURE

Made entirely of 100% pure tin. . . Any length.

$\frac{3}{8}$ "—5 oz. per running foot | $\frac{1}{2}$ "—6 oz. per running foot
 $\frac{3}{8}$ "—6 oz. per running foot | $\frac{1}{2}$ "—8 oz. per running foot

Other sizes and weights available.

MADE OF VIRGIN STRAITS TIN

Beer Coils Made to Order

TESTED UNDER **200** POUNDS PRESSURE

Furnished with brass protection ferrules.

Attractively Priced.

42' Coils on 20" x 5" galvanized drums.

50' Coils on 24" x 5" galvanized drums.

75' Coils on 24" x 5" galvanized drums —
double wrapped.

THE **EAGLE-PICHER**
LEAD COMPANY · CINCINNATI
CHICAGO · JOPLIN

ASSOCIATION

Activities

The Illinois Meeting

ON May 10 some forty members of the Illinois sheet metal and heating contractors association and members of the salesman's auxiliary met in the Hotel Endres, Peoria, Illinois, for an "old timers" meeting. This meeting takes the place of the annual state convention not held this year because of general business conditions.

The meeting was staged without the usual preliminary publicity and in view of this fact represented an excellent turnout. A new program was adopted with the business meeting held in the afternoon followed by a banquet and an evening session to close the convention. It was remarked by several members that this unusual plan brought out a 100 per cent attendance at all sessions for the first time in the history of the association.

Of unusual interest to those attending and to all readers as well, was the widespread report of a business pickup in all lines. Contracts are not individually large, but there seems to be more heating, sheet metal and repair work of all kinds out for bids and waiting for letting than at any time since 1931.

Of equal interest was the surprising reports of work taken and new sale opportunities made possible by the revived beer business. Contracts have been secured from breweries, from all kinds of beer dispensaries and from commercial establishments selling or competing with beer.

One of the important discussions centered around the problem of increasing and of holding association memberships. President Eynatten and Secretary Snelson sided with

Officers for 1933

President—Frank I. Eynatten, Peoria.

Vice-president—Chas. R. Radtke, LaSalle.

Secretary—C. L. Snelson, Peoria.

Treasurer—James Barrett, Alton.

Director, three years—Griff J. George, Springfield.

other members in the contention that a full and growing membership was more important than the collection of the dues. This sentiment was encouraged by the report of state treasurer Barrett who reported that state finances were remarkably good. His report showed sufficient funds to carry on the state work for another year. Treasurer Barrett suggested that in view of this sound condition, a moratorium be declared on dues and that a drive for members be made even if some prospective and old members, also, cannot pay now.

The discussion led to a vote and the organization agreed to carry embarrassed members and try to bring in new members as well.

Speaking on this subject George Harms declared that organization is highly essential and really beneficial today and that it is more important to keep an active, interested association together than to worry too much about dues, especially when there is money in the treasury.

An interesting discussion centered around the matter of present day selling methods. State Director Griff George contended that there is too much high pressure salesmanship and that quality work rather than price is of most importance. He also declared today a

good time to develop local cooperation between firms. Every firm operating in a given community needs to work with all other local firms to keep our rightful work in the trade.

He cited conditions in his home community where the carpenter contractors are applying cheap composition roofs with paper valleys and taking the gutter and downspout work along with the roofing.

Jack Stowell of Aurora, while agreeing that competition from such trades as carpenters is harmful and serious, declared that he favored salesmanship. Every business man today, said Jack, must justify his being in business. The contractor may be an excellent mechanic or do quality work, but the public must be told about these virtues and salesmanship is necessary.

Every contractor should have a selling plan, he said. The plan may be very simple or it may be elaborate, but there should be a plan. Large firms and small firms have failed or have succeeded during this depression, he pointed out, and practically the only reason for success was a selling plan and the courage to ask a fair price and be able to sell this price to the buyer.

During the afternoon session officers were elected for the coming year.

At the close of the business session a recess was declared after which a banquet in the form of an old fashioned family dinner with all the trimmings was held. The banquet was tendered by the Peoria association.

The salesman's auxiliary was well represented by members from all parts of the state.

Perforated Metals *for every requirement*

Steel, Brass, Bronze, Copper, Monel
Aluminum, Stainless Iron, Zinc

or any other metal

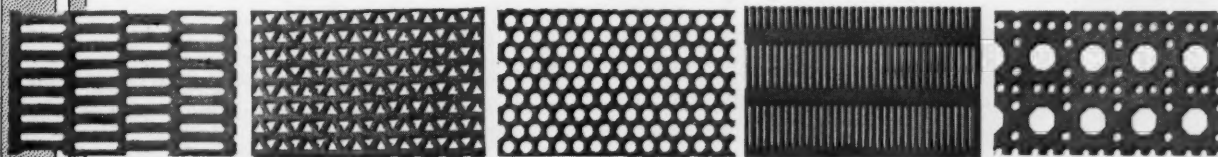
PERFORATED TO YOUR ORDER

Round holes from .020" to 7" Diam.

Oblong and Slot holes from .008" to 3" wide.

Grilles of distinction for fine buildings

Everything in Perforated Metal



THE HARRINGTON & KING PERFORATING CO.

5649 FILLMORE ST., CHICAGO, ILL., U. S. A.

NEW YORK OFFICE, 114 LIBERTY ST.

When Your Prospect Begins Asking Questions



There is plenty you can tell him about Moncrief
Furnaces which will convince any man who
wants all the latest improvements in warm air
heating;

And a full line to meet any need, in any size;
at a price which enables you to get the job
in the face of stiff competition.

*Write for circulars on the types
in which you are interested.*

THE HENRY FURNACE & FOUNDRY CO.
3471 E. 49th St., Cleveland, O.

Branches and warehouses in the principal cities.
We supply everything used on a warm air heating job.



Series "C"
Cast Furnaces

MONCRIEF

Air Conditioning Systems

Series "S"
Steel Furnaces

Moncrief
Aristocrat

Pipe and Fittings

Gary District of Indiana Association Discusses Air Conditioning

THERE are two ways of judging any meeting. One is to ask whether, in the good old phrase, "a good time was had by all," and the other is to ask whether those in attendance came away with sound information. If the answer to both questions is in the affirmative, the meeting is doubly a success.

Both elements were present in the district meeting held at Levant's Fish House, Robertsdale, Ind., on May 5th. First, and most important, of the preliminaries was a fish dinner. When the fish had been cleared away—as they were—Ed Carter of Snips and Harry Jones of Indianapolis, took on the joint job of introducing the seventy-five in attendance. Paul R. Jordan then opened the meeting with a brief address of welcome. Charles F. Gatz, chairman of the Gary District took over the gavel for a few introductions. The meeting then got down to the business of considering air conditioning, with J. D. Wilder of AMERICAN ARTISAN outlining the program and introducing each speaker in his turn.

With a house plan, including data sheet, before them, the heating men followed the addresses of the first two speakers. Platte Overton and Guy Voorhees opened the meeting with talks, respectively, on the design of the system for the house in question, and with the detailed figures used to arrive at the necessary capacities. While time did not permit completely figuring the job, many practical pointers were brought out, some having to do with the mechanical code.

Following Mr. Overton and Mr. Voorhees, Albert Wilkins of the Cook Electric Co. talked on controls and their hook-up. In answer to a question from the floor, Mr. Wilkins went at some detail into the difficulties encountered on control jobs and described the measures taken to correct them.

The last two speakers on the program covered the merchandising aspects of air conditioning. Frank Myers of the Owens-Illinois Glass Co., took the stand that the way to sell air conditioning, with particular reference to filtered air, was to forget mechan-

ical details and to sell the housewife on the idea of clean air. She will much more quickly grasp the value of filtered air which means less dust, longer life to rugs, draperies and furnishings, and more healthful conditions in the home.

J. A. Harris of South Bend, a contractor of wide experience, called attention to the great spread of publicity on the subject, giving the dealer a ready audience. "The alert and well informed dealer," he said, "who can properly engineer his own jobs and add to the tabulations on his data sheet those items taken from practical experience is sure to assume a commanding position in his locality."

The attendance at the meeting was extremely satisfactory. Remington, LaFayette, South Bend, Gary, Hammond, Ft. Wayne and New Castle, Indiana, were represented, as was Toledo, O., and Chicago. Indianapolis brought a group of 28 men, including "Pop" Voorhees, having chartered a bus for the trip.

Philadelphia Celebrates 30th Anniversary

THE Roofing, Sheet Metal and Heating Engineers of Philadelphia held their 30th anniversary dinner at Maries in Philadelphia with President J. A. Miller as toastmaster. He, in turn, introduced one of his active members, John Frick, who then introduced the speaker of the evening, Richard Weglien, sheriff of Philadelphia who gave a very interesting talk on the duties of a

sheriff and the workings of its office. His brother, Louis Weglien, a candy manufacturer, was also introduced and told some humorous stories.

President Miller then introduced one of the chief workers for association activity, Benj. F. John, who recalled history of the association from 1903 to the present and complimented Fred Ritter, secretary, for the work he

had done over the past five years. Mr. John said he feels certain as business improves so will the membership of the association.

The association voted to hold its annual outing in June, exact time and place to be set later.

Outing committee chosen is Walter Rhea, John Frick, Richard Guenther, Fred Ritter, secretary.

APOLLO

Chrom Copper
the
Satisfactory
Metal for
Bar
Installations



For Bars, Novelty Boxes or Beer Coolers, APOLLO ChromCopper is the correct and permanently satisfactory metal to use.

APOLLO ChromCopper is immune to corrosion by beer or water. It cannot be discolored by fruit and food acids. It cannot rust, nor chip. It is endorsed by brewery engineers for all types of beer dispensing equipment and it is in wide use by leading manufacturers of beer dispensing equipment.

Highly polished or satin finished sheets available in size 36x96 for immediate shipment.

It will pay you to have APOLLO ChromCopper on hand for taking care of the beer business as well as for its many other uses; sink coverings, drain boards, steam tables, ice cream cabinets, table tops or any other metal demands of this nature.

Write today for prices and reference to nearest jobbers stock.

APOLLO COMPANY, La Salle, Illinois

Eliminate Smoke *with the* ATH-A-NOR

THE old saying "Where there's smoke there must be fire" cannot be applied to the ATH-A-NOR, the original smokeless furnace, because combustion is so complete in the ATH-A-NOR, that smoke and soot are eliminated.

When a new charge of coal is added to the fire in the ATH-A-NOR the Air Blast immediately supplies the proper mixture of air above the coal. The mixing of this air with the volatile matter causes a state of combustion so complete, that it assures the furnace owner of the most heat from the fuel burned.

Where combustion is not complete, the result is a lot of smoke



* *The* *
ATH-A-NOR
Smokeless Pipe and
Pipeless Warm Air
FURNACE

pouring out of the chimney into the surrounding neighborhood which makes nobody happier. Also, of most importance, the smoke thus disappearing is fuel dollars which are being thrown away by the furnace.

This economical feature is an important reason for the ready acceptance of the ATH-A-NOR and is one reason why furnace dealers handling the ATH-A-NOR can show furnace profits.

We will gladly mail you literature at your request. At the same time if you desire, we will tell you all about the Akron Air Blast and the Solid Comfort, leaders in the furnace field for the past 43 years.

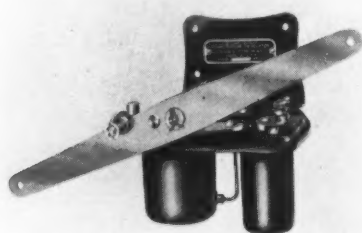
The MAY-FIEBEGER CO., Newark, Ohio

New PRODUCTS

Temperature Regulator

A new temperature regulator assembly consisting of a thermostat, transformer, motor unit and the necessary wire, pulleys, chain, etc., is announced by the Detroit Lubricator Company, Detroit, Mich.

The equipment is said to be close and accurate in its control, neat in appearance, quiet but amply powerful,



easy to install, does not require an electrician and provides safety margins for any emergency.

The motor is low voltage and oper-

ates by vaporizing liquid under heat which in turn produces a pressure through a bellows to actuate the motor arms. The thermostat has a metallic blade and a magnetic make and break. Additional equipment consists of a furnace limit switch and a day and night control.

Complete information on prices, design and operation of the units will be supplied by the Detroit company.

Bench Punch

A new lever type bench punch with a rated capacity of $\frac{5}{8}$ -inch hole through $\frac{1}{4}$ -inch up to a 2-inch hole through $\frac{1}{8}$ -inch iron is announced by the W. A. Whitney Company, Rockford, Ill.

The punch has a 10-inch throat and uses stock sized punches and dies. A notching punch and die for this tool are also being manufactured.

Complete information on the new punch may be obtained from the company.

Heat Booster

A new one-pipe heat booster arranged for mounting on either floor or side wall registers is announced by the Victor Electric Products, Inc., Cincinnati, Ohio.

The floor type consists of a propeller fan and direct connected motor suspended in a cradle which is placed across the heat pipe under the register face. The side wall type has the same motor and fan mounted on a facing which comes in standard register face sizes. Suitable clamps are provided for mounting.

The fans can be connected into the nearest electric socket and are turned on and off at the fan.

The units are designed for use on pipes to hard-to-heat rooms. Once the leader is cleared of cold air the fan can be turned off. Attractive window displays and literature for the prospect are furnished. Information on costs and the sales plan can be obtained from the company.

DEALERS—CAPITALIZE ON
CHICAGO WORLD'S FAIR
HESS EQUIPMENT EXHIBITED
IN HOME PLANNING HALL



YOU ARE
CORDIALLY
INVITED TO
VISIT OUR
EXHIBIT AND
OUR FACTORY
WHILE HERE
FOR THE
FAIR

THE BENEFACITOR IS A QUALITY STEEL FURNACE AT A LOW CAST IRON PRICE.

THE HESS LINE IS COMPLETE, INCLUDING AIR CONDITIONERS AND ACCESSORIES.

ASK FOR OUR NEW DEALER PORTFOLIO DESCRIBING OUR COMPLETE LINE.

HESS WARMING & VENTILATING CO.
1201-1211 SO. WESTERN AVENUE CHICAGO, ILL.



VIKING SHEARS

Built of the finest materials used in the making of shears, with special features, and backed by our guarantee, you will find Viking Portable Bench Shears outstanding as money savers on the small or large job. And—Viking Shears serve you best out on the job where they can be used as snips.

VIKING SHEAR CO., ERIE, PA.

Improved Cleaner

Breuer Electric Mfg. Co., Chicago, Ill., announce new features and improvements on the 1933 model furnace vacuum cleaner. These features are—a raised glass bowl observation glass

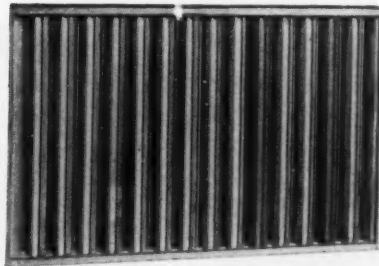


which shows the dirt going through the cleaner; new extra heavy plugs for longer life; increased power from the fan; and improvements in brushes, nozzles, handles, to facilitate cleaning and make possible a faster and better cleaning job.

Literature and information have been prepared and will be mailed upon request to the company.

Air Filter

The illustration shows a new type of air filter known as the Interceptic



Air Filter being manufactured by the W. R. Ripley Co., 303 Bernice Building, Tacoma, Wash.

The filter is said to be new in principle. The filter consists of radiator shaped section made of specially formed plates at front and rear with a wood separator section inside. The catching medium is oil with the oil held in hundreds of small spiral pockets from which the oil seeps to the surface. The filter is said to present a low resistance, to have sufficient oil for an entire season and to catch even air suspended soot.

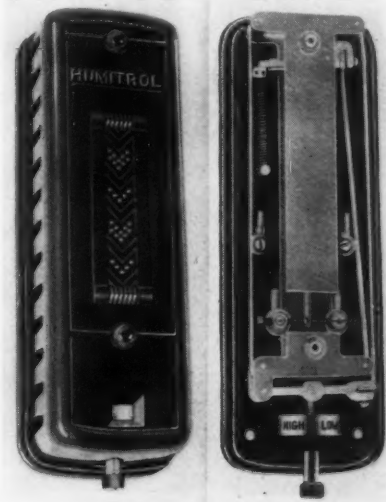
Information can be obtained from the company.

Humidity Control

A new low voltage, open contact humidity control for direct use in systems using up to 25 volts and in higher voltage circuits by use of a trans-

former relay is announced by Lewis Air Conditioners, Inc., 829 Second Ave., South, Minneapolis.

The unit is calibrated at the factory for per cent and range specified in the order, usually 40 per cent and a differential of 4 per cent. The unit is said to be adjustable to a closeness of 1 per cent while the user can adjust



the 10 per cent up or down by moving the dial to "high" or "low."

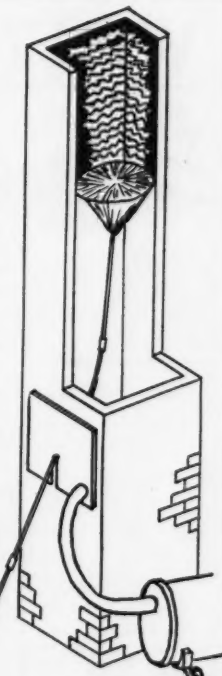
Complete information is contained in a leaflet which the company will mail together with prices and details of application.

You'll Find Money In Every Chimney

BOTH you and the owner profit when you clean the chimney with the Super Revolving Brush. Works best with the Super Vacuum Cleaner, but no cleaner strictly necessary. Does its job quickly, thoroughly; keeps you off the roof.

This is the season to make the money. It will not last forever, competitors are harvesting now. Get a Super Outfit and sell cleaning, conditioning, new plants. All there now waiting for you, or for some live wire looking for profitable jobs. Write for free trial, and try the idea before you buy.

THE NATIONAL SUPER SERVICE COMPANY
1944 North 13th Street, Toledo, Ohio



THE Super Furnace Cleaner weighs only 54 lbs.,—pulls 150 cubic feet of air, at speed of two miles per minute—motor is ½ h.p. plus—operates off any outlet, no big fuses—only fine dust gets to the bag, all else trapped in metal container, emptied like a coal scuttle—cleans 'em hot or cold.

BEER fittings

WE are manufacturing and can furnish the following:

- | | |
|--|---|
| Bar Faucets | Register Cocks with Hex Nut and Hose Nipple |
| Brass Bung with Check Valve | Angle Beer Nipples |
| Bung Wrenches | Tee Fittings for 5/16" Hose |
| Brass Air Cocks | Unions |
| Draught Tubes for Half Barrel | Faucet Couplings |
| Draught Tubes for Whole Barrel | "Y" Branches |
| Draught Tube Cocks with Wing Union Nut and Hose Nipple | Rod Elbows |
| | Washout Nipples |
| | Box Connections—2"—3"—4" |

We distribute through the Wholesaler

KITSON CO.

WESTMORELAND & STOKLEY STS.
PHILADELPHIA PA.

The Return of Beer

AND THE

» » » THE return of beer has created countless new outlets for the dispensing of beer which are an open market to the sheet metal contractor.

Now, when these taverns, inns, or whatever they might be, are being put into shape welcoming patrons, there is a golden opportunity for sheet metal men to sell them Canton ornamental steel ceilings.

Owners of these establishments are really receptive

Canton Steel Ceiling

to anything that will enhance their opportunities to create a steady patronage.

Look into this market. Ask us how you can best meet this situation.

Sold through leading Sheet Metal jobbers in the United States.

CANTON STEEL CEILING COMPANY, CANTON, OHIO

BEER EQUIPMENT and ACCESSORIES

One of the oldest beer equipment manufacturers in the country

Established 1856

**FAUCETS • UNIONS •
BUNGS • RODS • COCKS**
WASHOUT AND ANGLE CEILING NIPPLES
Write for Circular

CHARLES PERKES CO.
1508 N. Mascher St.
PHILADELPHIA PENN.

There's
money
IN
every
can of

"370 SPECIAL RED"

THOMPSON & CO.
P. O. Box 537, N. S., Pittsburgh, Pa.

THE profit possibilities of "370 SPECIAL RED" are bounded only by the number of sheet metal roofs in your community. These roofs must be painted regularly if they are to continue to protect the buildings they cover.

Paint them with "370 SPECIAL RED," a heavy bodied Red Oxide Paint designed for tinnerns and roofers, which offers long time protection to metal surfaces exposed to the elements. Made of Pure Red Lead, Spanish Sesqui-Oxide of Iron and highest grade Raw and Boiled Linseed Oil.

Write for full information and literature on other Thompson paints.



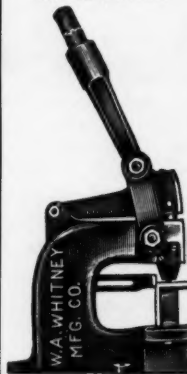
WHITNEY LEVER PUNCHES

No. 4B PUNCH



Length—8½ inches. Capacity ¼-inch hole through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—½" to ¾" by 64ths.

No. 91 PUNCH



Capacity — ¼-inch hole through ¼-inch, 1-inch hole through ½-inch and 2-inch hole through ¾-inch iron. Depth throat 5-inches. Weight — 82 lbs.

No. 1 PUNCH



Length — 34 inches. Capacity — ¼-inch hole through ¼-inch iron. Punches and dies in sizes from ¼ to ¾ by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — ½-inch hole through ¼-inch iron. Punches and dies in sizes ½-inch to ¾-inch by 64ths.

CHANNEL IRON PUNCH



Companion to No. 2 Punch. Every part of the two Punches interchangeable, including punches and dies. Capacity — ¼-inch hole through ¼-inch iron.

No. 6 PUNCH



Length—26¼ inches. Capacity — ¼-inch hole through ½-inch iron; especially adapted for button punching or templet work. Punches and dies ½" to ¾" by 32nds.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber

W.A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

News Items

Furnaces at Chicago Fair

Among the most striking features of the Century of Progress Exposition, opening in Chicago, May 27, is the glass-block building and tower erected by Owens-Illinois Glass Company of Toledo, Ohio. Of principal importance among the Owens-Illinois exhibits shown in this "Crystal Palace" is a complete display of various types of warm air furnaces and equipment.

The opening of this exhibit coincides with the annual meeting in Chicago of the National Warm Air Heating Association, June 6-7-8. Members of the Association will be interested in this display, not only on account of the ultra-modern warm-air heating appliances and air filtration devices shown, but also because of the striking beauty of the building which houses them.

The highly original type of architecture employed in the construction of Owens-Illinois' glass structure will undoubtedly attract millions of visitors at the Fair to learn the story of clean warm-air heat. All types of warm air heating equipment, including blower and gravity type furnaces of both cast iron and steel construction, will be shown.

Stoker District Manager Appointed

John J. Griffin of St. Louis, has been appointed District Manager for the Holcomb & Hoke Mfg. Co., Indianapolis, line of stokers in that territory.

Mr. Griffin is a veteran in the field of combustion engineering and heating and has had a wealth of experience in the stoker business.

Rudy Furnace Shipments Up

Unit shipments of furnaces by the Rudy Furnace Co. in April were 69 per cent better than in March and 100 per cent better than in April, 1932, A. F. Frazee, general manager, stated today.

Shipments of residential Bon-Air Conditioners in April were 50 per cent ahead of March and 100 per cent better than April, 1932.

Although operations of company are still below normal, improved orders for furnaces and domestic hot water heaters appearing since the end of March have necessitated a stepup of foundry operations of about 25 per cent over levels prevailing so far this year.

R & B Appoint Philadelphia Manager

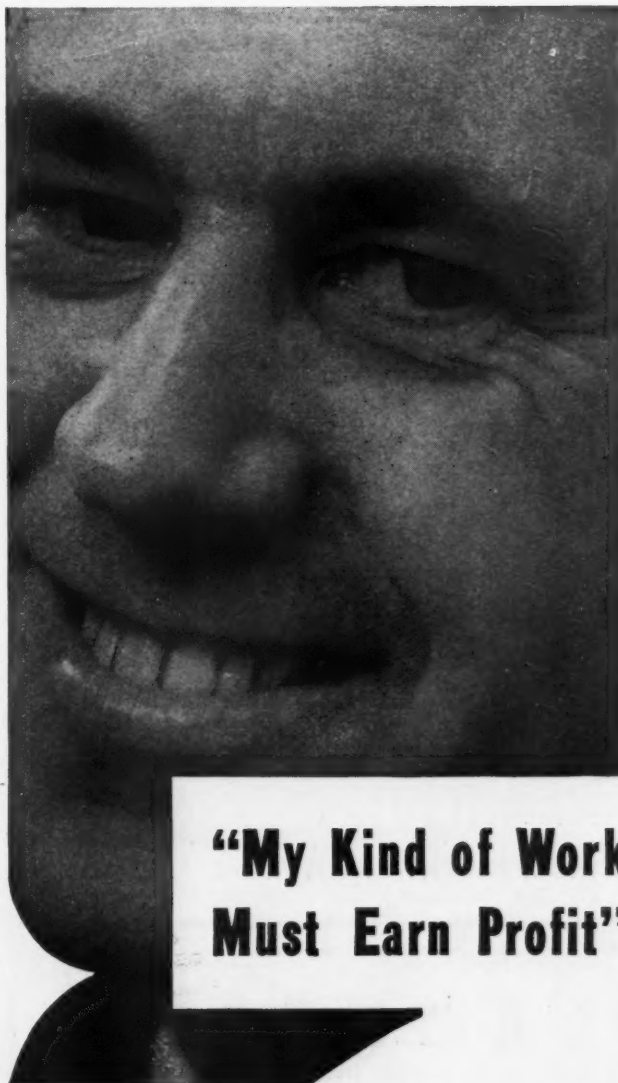
The Richardson and Boynton Co. announces that William E. Tinker has been appointed manager of the company's Philadelphia office. Mr. Tinker has been associated with the heating industry for 25 years. The Philadelphia office has been in existence for 34 years.

Aluminum Company Moves

The Aluminum Company and its subsidiaries are now located in the Gulf Building, Pittsburgh, Pa.

Allsteel Distributer

The Allsteel Press Company, 12015 S. Peoria St., Chicago, manufacturer of the Verson Allsteel line of punch presses, press brakes, dies and sheet metal working machinery, has appointed as exclusive representative in the Pittsburgh district Leonard R. Nourie, Park Building, Pittsburgh, who now offers a complete service to sheet metal working plants.




**"My Kind of Work
Must Earn Profit"**

HE turns out the sort of work of which any contractor could feel proud. And he uses Armco Metals—Ingot Iron especially—for all it's worth. We send him shop-helps, such as job cards, sales letters, advertisements, blotters, folders, and he promotes his competent service wisely and well. His business earns him a nice profit, good times or poor. That's not peddling for odd jobs at starvation prices—it's selling good work at a profit. You can do the same. Shall we show you just how? Write to us.

THE AMERICAN ROLLING MILL COMPANY

Executive Offices: Middletown, Ohio

There's an Armco Distributor Near You




SHEET METALS

Create Profits

out of

Customer-Satisfaction

Every month "Ingot Iron Shop News," offers you ideas and suggestions on how to increase sales, cut costs, and turn out work that satisfies customers. Published for ambitious contractors by the Armco Distributors' Association. Write for your free subscription.



The
ALLEN
MULTI
VANE
**TURBINE
VENTILATOR**

Exclusive inner Multi-Vane construction assures unparalleled results.

THE ALLEN CORPORATION
1036 14th Street
DETROIT, MICH.

**FORCED AIR
REGISTERS**

Always a pioneer and originator of new and better ideas in registers, Independent Register has the complete answer to the question of what to do about Registers and Grilles for Forced Air and Conditioned Air Systems.

May we send you a booklet?
Originators and manufacturers of the famous "Fabrikated" Cold Air Faces
—82% Open Area.

INDEPENDENT

INDEPENDENT REGISTER & MFG. CO.
3741 East 93rd Street Cleveland, Ohio

FILTAIRE

Style A, a gravity filter for warm air pipes. Styles B and C for cold air returns and shoes. Style D and specials for forced air systems.

FILTAIRE solves your air cleaning problems.

Write for Dealer Proposition

FILTAIRE CORP.
111 W. Bruce St.,
MILWAUKEE, WIS.



FILTAIRE, Style B.

CHICAGO




Box and Pan Brake Power Squaring Shear

STEEL BRAKES—PRESSES—SHEARS

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO

News Items

Minneapolis Honeywell Moves Chicago Office

The Minneapolis Honeywell Regulator Company of Minneapolis announce the removal of their Chicago office to the new American Bankers Insurance Building, Wabash Avenue and Ohio Street.

Republic Steel Office Moves

Effective May 20, 1933, the Buffalo District Sales Office of Republic Steel Corporation will be moved to 475 Abbott Road, Buffalo, N. Y., according to an announcement by N. J. Clarke, Vice-President in Charge of Sales.

Thos. B. Davies, District Sales Manager, and his present staff will continue in charge at the new location.

Kelsey Moves New York Office

The Kelsey Heating Company, Syracuse, N. Y., announces the moving of their New York City office to 5 East 44th St. The old address was 9 East 46th St.

Philip Goldstein Dies

Philip Goldstein, formerly a resident and business man of Indianapolis, passed away in Los Angeles, May 7th.

Mr. Goldstein, who was a resident of Indianapolis for thirty-eight years, moved to Los Angeles nine years ago. While in Indianapolis he was the head of Philip Goldstein & Co., sheet metal contractors at 1010 South Meridian Street, which business was taken over by his son Charles Goldstein, when the senior Goldstein retired.

Peck, Stow & Wilcox Officers

The Peck, Stow & Wilcox Co. of Southington, Conn., elected Mark J. Lacey President and General Manager to succeed George S. Case, who became Chairman of the board.

Frank L. Wilcox remains Vice-President, and Chas. F. Treadway is Vice-President and Treasurer. Ralph W. Hurlbut was elected Secretary and Samuel C. Wilcox was elected Assistant Secretary and Assistant Treasurer. Edward G. Hackbarth was appointed assistant to the president and Adolph J. Trapp, superintendent of manufacturing.

The Peck, Stow & Wilcox Co. was established 114 years ago and today is known throughout the world among the leading manufacturers of metal working machinery.

Torrington Buys Arcoil

The Torrington Mfg. Co. of Torrington, Conn., manufacturers of propeller type fans for 32 years, has purchased the good will, patents and tools of the Arcoil Manufacturing Co., Newark, N. J., makers of "Arcoil" patented squirrel cage type fans, and will manufacture and sell both types of fans.

H. H. Hill, for the past nine years sales engineer for American Blower Co., will from now on represent the Torrington Company in the sale of their blower wheels and propeller fans.

Metal Trades to Meet in Chicago

The annual congress of the National Metal Trades Association will be held at the Congress Hotel, Chicago, June 7th. Extensive plans are being made and a program of unusual interest is promised.

News Items

Death of Frank M. Farber

Frank M. Farber, President and Secretary of the Marshalltown Manufacturing Company, Marshalltown, Iowa, died April 27, after having been seriously ill since April 22. Mr. Farber suffered a ruptured appendix.

Mr. Farber had been prominent in manufacturing business of Marshalltown since 1917 when he became Secretary and Manager of the old Bogardus-Nelson Company, manufacturers of steam gauges. When that company and the Lennox Throatless Shear Company were merged in 1918 to form the Marshalltown Manufacturing Company, he became Secretary and Manager and succeeded to the presidency of the firm after the death of J. C. Williams.

Cleveland Election

The Cleveland Sheet Metal Employers Association held their annual election on April 11, 1933. Mike Cutter of the Cutter Sheet Metal Company was elected president, with C. MacRae vice-president. W. E. Feiten was re-elected treasurer and D. A. Mannen, secretary.

The new executive board is now made up of Messrs. Cutter, MacRae, Boehm, Birmingham, Feiten, Riester and Mannen.

New Engineering Service

George Myers, formerly of the Carrier Corporation, and for twelve years connected with heating and ventilating work announces the formation of the Myers Engineering Equipment Co., Mart Building, St. Louis, Mo.

The company has also opened a branch office in Eldorado, Ill., under the direction of John C. Porter.

The company will act as consultants and sales representatives for heating, ventilating, drying, humidifying and general air conditioning apparatus in the area around St. Louis.

Dail Representative for S. E. Wisconsin

W. R. Williams, 378 Jackson Drive, Oshkosh, Wisconsin, has just been appointed sales engineer and representative for the Dail Steel Products Company, manufacturers of the Dailaire system of heating and air conditioning and Dailaire Conditioners, for southeastern Wisconsin—traveling as far north as Antigo, Wisconsin, and as far east as a line through Wisconsin Rapids, Baraboo, Madison, Janesville, and Beloit, and will be at the service of dealers in that territory on the Dailaire line immediately.

New Shop for Mason City, Iowa

Carl M. Ekborg has opened a sheet metal shop at 27 First street S. E., Mason City, Iowa, to do a general sheet metal business. He will also do furnace work and all types of sheet metal repairs.

Johns-Manville Moves Offices

Johns-Manville Corporation has moved its general offices to 22 East 40th St., at Madison Ave., New York City. The company will occupy six floors, the seventh, eighth, ninth, tenth, eleventh and twelfth, in the new building.

These new offices are designed to be among the best equipped and most efficient in the country. The entire space will be air conditioned with provision for summer cooling and dehumidifying as well as winter heating and humidifying.

Thermostatic Devices

Thermostatic Devices developed to actuate relays and fractional horse-power motors, temperatures up to 600 degrees Fahrenheit.

Thermostat Department

COOPER OVEN THERMOMETER CO.
PEQUABUCK CONNECTICUT

Sell Furnace Repairs and Make Money

with Breuer's Ball Bearing
TORNADO

Furnace Cleaning Service



The TORNADO gets you into the basement where it is easy to sell repairs and new furnaces. And you make a profit on the cleaning job too. Hundreds of dealers say the TORNADO increased business beyond all expectations. We'll send you on request the name and statement of a dealer near you to prove our claims.

The TORNADO is the most powerful portable furnace cleaner built. Complete with 10 necessary attachments. Low price—easy payments—free trial. Approved by Anthracite Institute and Underwriters' Laboratories. Write for complete information on a real money maker.

Breuer Electric Mfg. Co.
865 Blackhawk Street, Chicago, Ill.

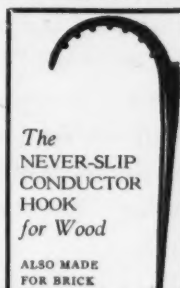
FURNACE & BOILER REPAIRS

GRATE BARS AND RESTS, FIRE
POTS, FEED SECTIONS,
FIRE BRICK, ETC.

IN STOCK . . . READY FOR
IMMEDIATE SHIPMENT

A. G. BRAUER SUPPLY CO.
312-18 NO. THIRD ST. . . ST. LOUIS.

NEVER-SLIP CONDUCTOR HOOKS for SAFETY at LOW COST!



The NEVER-SLIP Conductor Hooks can be driven in tight without fear of breaking or cracking off. The points on the hook hold firmly to the corrugations on corrugated pipe and also hold plain round pipe so that it cannot come loose. NEVER-SLIP Conductor Hooks are extra strong, made of malleable iron, sherardized, assuring long life.

Write for literature and a sample of the NEVER-SLIP.

LA CROSSE STEEL ROOFING & CORRUGATING CO.
LA CROSSE WISCONSIN

For Registers
Specify **WATERLOO**

—with no "register noise"

Illustrated Catalogue on Request
THE WATERLOO REGISTER CO., Waterloo, Ia.
Also 2211 First Ave. Seattle, Wash

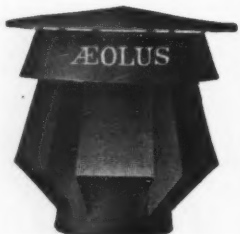
DIFFUSER

Install

ÆOLUS
Improved
VENTILATORS

FOR industrial buildings,
schools, homes, theaters, etc.
Made in 14 different metals.
Constant ventilation—no noise
—no upkeep.

ÆOLUS DICKINSON
Industrial Division of Paul Dickinson,
Inc.
3332-52 South Artesian Avenue
Chicago, Ill.



BELLEVUE STRATFORD

IN PHILADELPHIA



This great hotel has long stood as the symbol of Philadelphia's famed hospitality... Indeed, to many thousands of people throughout the world "The Bellevue" IS Philadelphia; because it so graciously blends fine, old tradition with every modern idea that could add to the comfort and enjoyment of its guests... and its rates are entirely consistent with present times.

CLAUDE H. BENNETT, General Manager

New Literature

Delphos General Catalogue No. 6

Delphos Manufacturing Co., Delphos, Ohio, have issued general catalogue number 6 describing the hundreds of items manufactured. The catalogue gives complete information on galvanized, long terne, annealed sheets, roofing and siding, roofing tools, tin and terne plates, eaves trough and conductor pipe and accessories, etc. Complete tables of sizes, weights and prices are included.

Contractors can get a copy from the company.

Welding Stainless Steel

A booklet, "The Welding of Enduro Stainless Alloys," is being released for distribution by Republic Steel Corporation, Central Alloy Division, Massillon, Ohio.

The booklet contains a large fund of comprehensive information on various welding methods as applied to different types of Enduro Stainless Alloys, including Electric Arc Welding, Gas Welding, Spot and Projection Welding, Seam Welding and Flash Welding. All of the data and recommended methods are the result of extensive research by Enduro Welding Engineers, both in the laboratory and in commercial welding shops.

Hot-Kold Catalogue

A new catalogue on the Hot-Kold system of air conditioning has been prepared by the Edwards Mfg. Co., Cincinnati, Ohio.

This catalogue presents a summary of the application of Hot-Kold units to residences, funeral homes, mercantile establishments and other structures.

Valuable chapters are included covering the construction of the units, each section describing in detail the function and operation of the equipment parts. There are also sections describing correct design of systems and installation practices.

Copies of the booklet can be obtained from the company.

Block Tin Pipe Calibre List

A list sheet covering block tin pipe suitable for beer cooling equipment has been printed by the Eagle-Picher Lead Co., Cincinnati, Ohio.

Listings of pipe from 1/4-inch to 3/4-inch diameter are shown with full information on outside and inside diameters, wall thickness, weight, safe working pressures and capacities.

Contractors engaged in beer cooler fabrication can get a copy of listing by writing the company.

Tiffin Art Metal Catalogue No. 12

A catalogue describing the Tiffin line of simplified furnace fittings and registers described as catalogue number 12 will be mailed by the Tiffin Art Metal Co., Tiffin, Ohio.

The catalogue gives complete information on sizes, weights, prices or registers and grilles, wall pipe and fittings, boots, boxes, heads, pipe, elbows, collars, bonnets and furnace accessories.

Automatic Humidifiers and Air Washers

The Shenandoah Manufacturing Company of Harrisonburg, Va., has issued an eight-page bulletin, 8 3/8 x 11 1/4 in., describing and illustrating the construction and operation of automatic humidifiers and air washers which are designed for installation in old or new homes, factories, stores, shops, offices, hospitals, apartments, schools, printing and engraving plants, etc.

Automatic Heat *and* Air Conditioning Section

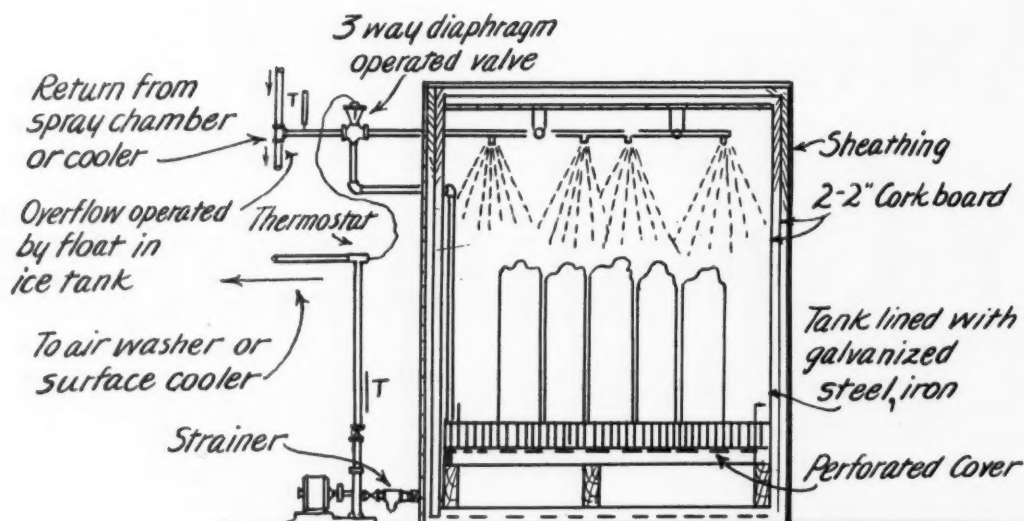
COOLING and CONTROLS

Visitors to the Century of Progress in Chicago are going to be interested in the cooling exhibits—what is more, they are going to take back some new ideas about summer home comfort with them. The warm air heating contractor has an especial advantage in talking to prospects during the summer months because a great part of his installation may be used both for heating and for cooling. For this reason, Professor Macintire's continuation of his series on cooling, with its actual test figures on cooling with ice, will be of timely interest. Once the warm air dealer gets under way in handling summer cooling, he has something to iron out the peaks of the business and something that will come closer to an ideal year-'round business.

A well known heating engineer with an enviable reputation as a trouble shooter says—"I believe that controls are the thing most heating men know least about and, further, are the solution to many of the problems at present facing air conditioning."

This statement comes after years of research, designing, active trouble-shooting with furnace heating. That it is true is proved by the inclination of heating men to use one standard system of control and, worse yet, to be ignorant of the whys and wherefores of that much used system.

We hope to contribute something to the information on controls with the series beginning in this issue. How this type of information can be applied is indicated in the story of the Naperville house where extraordinary problems necessitated three control systems before satisfactory conditions were secured.



In this system a thermostat operates the three-way valve. Spray water is maintained at a set temperature by passing the return water through the sprays, by-passing the sprays to the ice water pond or both. The text explains the operation

Comfort Cooling

By H. J. Macintire

Part III—Cooling With Ice

IT HAS been shown in the first two parts of this series the kind of cooling load to be expected in a comfort cooling job, particularly in reference to the cooling of a residence in the summer time. This load is due to five sources—the heat leakage through the walls, roof, windows and doors; infiltration of air from the outside; the heat due to illumination, cooking and people present; the heat due to solar radiation; and the moisture entering the house with the infiltration of air or by the opening of doors and windows, or from cooking operations and people present.

In part 2 the use of water for cooling was gone into and the limitations for its use were indicated. It was emphasized that the maximum water temperature permissible for cooling is approximately 55 deg. F. if any control is desired of the humidity of the air in the house.

At the research residence in Urbana, Illinois, the cost of water, delivered at 55 deg. F., is

	Per 1000 gal.
For the first 500 gallons per 24 hrs.....	37c
For the second 500 gallons per 24 hrs.....	30c
For the third 500 gallons per 24 hrs.....	22c
For the fourth 500 gallons per 24 hrs.....	12c
For the fifth 500 gallons per 24 hrs.....	9c

The cost of such comfort cooling, on one of the severe days of the summer of 1932 was found to require 6900 gallons per 24 hours, and the cost was \$0.90+ per day for the meter cost of the water. Undoubtedly the cost of the water for an average summer day would be less than this amount because it is hard to believe that the load would continue at these severe conditions for the entire 24 hours. It is worth stating, however, that the use of 6900 gallons per 24 hours or even half of this amount is a quantity which could not be used generally for a city or town water supply. It

would exhaust the local supply of water for deep wells if a demand on the water supply at such a rate was more than occasional.

In the case of ice we have a ready, convenient and satisfactory means of providing cooling. Water at approximately 40 degrees can be circulated, and either sprays can be used to wash and cool the air, or cooling coils, usually of the fin type, can be placed in the path of the air to be cooled. The equipment is nominal in first cost, and in general consists of an ice storage tank properly insulated and arranged so that the melting of the ice will be facilitated, and a means for bringing the air to be cooled effectively in contact with the ice water.

The equipment being of nominal first cost it will lend itself better to operation where the amount of service required extends over a short period of time, especially as the cost of ice is seldom less than \$4.00 per ton. By a short period of time is meant those more northern localities of the United States where comfort cooling is limited to three or four months, and only then during part of the time or parts of the day except when especially hot spells are met with when there will be three or four days of severely warm weather.

For latitude 40° at Urbana, Illinois, the record for the last ten years is shown in Table 1 where the number of days with temperatures of 85 degrees or over maximum outside temperature varies from 31 to 70. Certainly for residences, in localities having such short periods of uncomfortable weather it would not be wise to consider an elaborate installation which would go into much capital investment unless the installation conforms with the type of house being built.

If ice is to be used for comfort cooling it is essential that the ice be supplied at a nominal cost and that

Table 1—Number of Days of Stated Maximum Temperature and Number of Degree Hours above 85 F for Season from June 1 to October 1 at Urbana, Illinois

Range of Maximum Outdoor Temperature Deg F	Mean of Range	No. of Deg Hrs Above 85 F Per Day (From Fig. 11 at Mean of Range)	1932*		1931		1930		1929		1928		1927		1926		1925		1924		1923	
			No. of Days	Total Deg Hours	No. of Days	Total Deg Hours	No. of Days	Total Deg Hours	No. of Days	Total Deg Hours	No. of Days	Total Deg Hours	No. of Days	Total Deg Hours	No. of Days	Total Deg Hours	No. of Days	Total Deg Hours	No. of Days	Total Deg Hours	No. of Days	Total Deg Hours
85-87	86	1.0	23	23	22	22	15	15	17	17	19	19	12	12	14	14	18	18	12	12	14	14
88-90	89	10.5	16	168	14	147	13	137	15	158	14	147	10	105	17	179	20	210	12	126	12	126
91-93	92	30.5	11	336	9	274	15	457	5	152	8	244	6	183	8	244	17	518	4	122	7	213
94-96	95	56.0	4	224	18	1008	7	392	0	0	0	0	4	224	6	336	8	448	3	168	6	336
97-99	98	86.0	6	516	7	602	7	602	0	0	0	0	0	0	0	0	3	258	0	0	1	86
100-102	101	119.0	1	119	0	0	5	595	0	0	0	0	0	0	0	0	1	119	0	0	0	0
103-105	104	152.0	1	152	0	0	2	304	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			62	1538	70	2053	64	2502	37	327	41	410	32	524	45	773	67	1571	31	428	40	775

* Data for 1932 based on results at Research Residence.
Data for 1923-1931 from U. S. Weather Bureau.

the service be reliable. We do not need crystal ice as supplied for the ordinary household trade. It can be opaque, and it does not need to be in solid cakes. In fact, some installations have made use of flakice and other forms of manufactured ice, but as a rule the form of storage tank should be selected best suited for the kind of ice to be used.

Cost of Ice Cooling

As the cost of operation is determined in the main by the cost of the ice delivered to the storage tank, it must not exceed \$4.00 per ton. Using the results of the research residence again, the maximum load during any of the test days during 1932 corrected for losses not justified in comfort cooling amounted to 3144 lbs. of ice during a period of 24 hours. At \$4.00 per ton of 2000 lbs. the cost of maintaining an average dry bulb temperature of 80.8 deg. F., an effective temperature of 72 degrees, was $3144 \div 2000 \times \$4.00 = \6.29 for the ice alone, where the entire house except the attic and the sunroom on the west side were cooled. A total of 43.3 tons of ice were used during the season at a cost of \$173.20 for a period of 62 days when 85 degrees or higher were experienced. In addition to the cost price of the ice, there is a certain amount of electric power required. This varies considerably and includes the air circulating fan, and the power required for the sprays and for circulating the cold water. This power may vary from $\frac{1}{2}$ to $\frac{3}{4}$ KW for the house of the size of the research residence.

Equipment Required

For ice the equipment required consists of an ice storage tank, either a spray chamber with nozzles or a compartment with coil surface, and the necessary nozzles, pumps and piping to complete the job. As it is now more or less usual to circulate the warm air through the stacks and risers by means of a fan no additional distribution equipment is necessary. A new house would undoubtedly have both heating and cooling equipment when the house is erected. If comfort cooling is added later it will cost an additional amount for the necessary changes and connections.

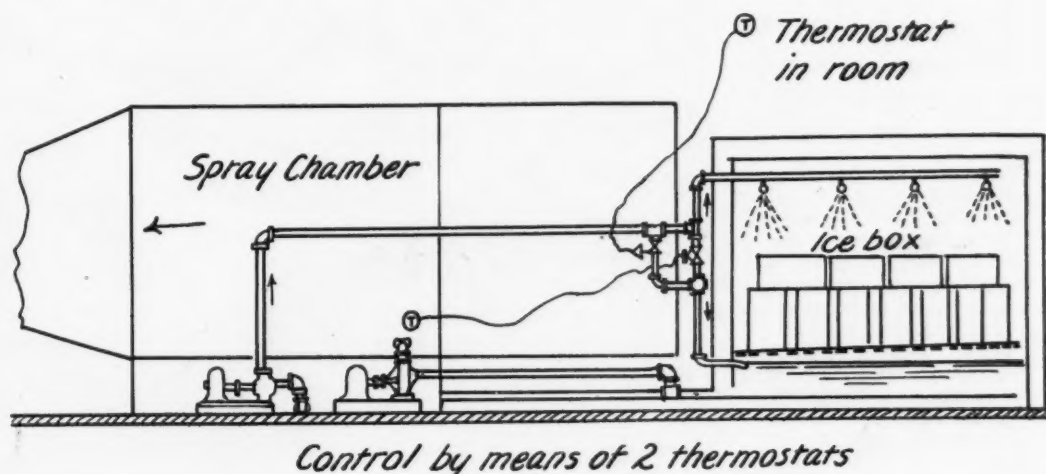
The size of the ice storage tank should be sufficient to hold a reasonable amount of ice. In the research residence the tank was about $4\frac{1}{4} \times 5\frac{1}{2} \times 3\frac{1}{2}$ feet high in the clear above the ice racks. Allowing roughly 60 cu. ft. per ton of ice, such a tank could take a ton of ice with ease if suitable provision is made for loading and if delivery of such amounts would mean lower ice costs.

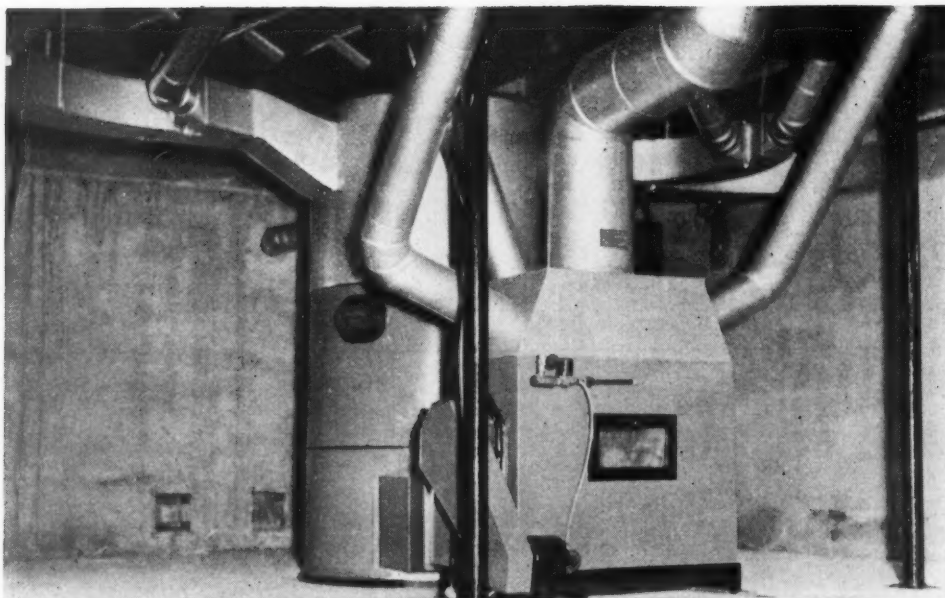
Tank Construction

The interior of the tank should be lined with galvanized iron of at least 20 gage and the insulation should be adequate. This is usually 3 inches of cork-board, or 6 inches of granulated cork. The thickness of the insulation and the kind used varies considerably and must be decided by the service desired. It is very

[Continued on page 53]

Here two thermostats and two pumps are used. The room thermostat controls the amount of water pumped into the spray chamber, while a spray chamber controls the amount of water passed through the ice chamber sprays





The equipment consists of a cast-iron furnace, fired with a conversion gas burner, a conditioning unit with filters, blower and sprays and full automatic controls. The high bonnet with short rectangular mains and round pipe branches are shown

Controls and Piping Design Feature This Illinois Installation

HOW the air conditioning contractor can apply his judgment and practical experience in designing and developing a system which will produce results satisfactory to the owner at a considerable saving in cost, is illustrated in the installation shown and diagrammed in this article.

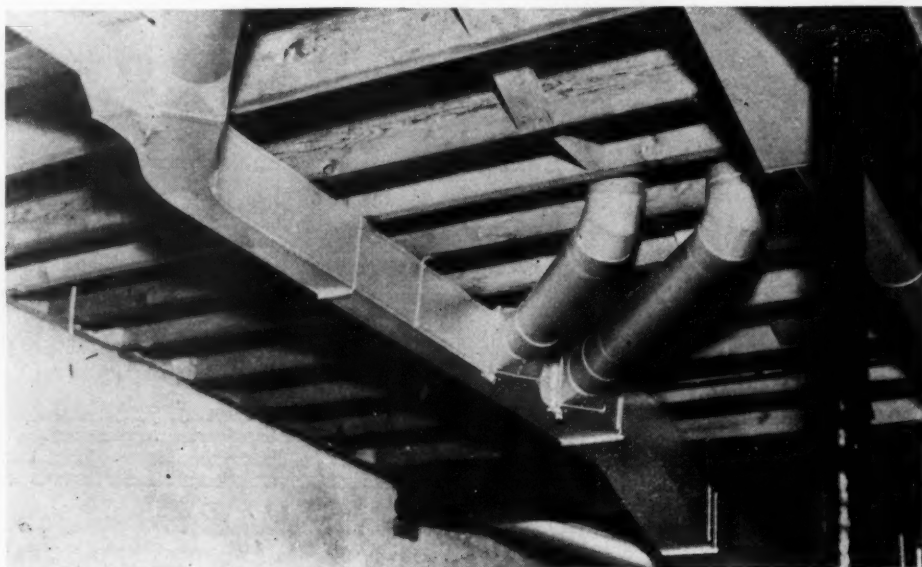
This installation is in Naperville, Illinois, and was designed and installed by Jack Stowell of Aurora, Ill. The equipment consists of a Sunbeam furnace, using a Republic conversion gas burner, a Premier conditioning unit with the filter top housed in for direct return from the rooms and Cook controls.

The photographs indicate that several interesting design and installation practices were used. For in-

stance, the furnace casing. The particular furnace used is comparatively low, but the bonnet is carried just as high as possible in accordance with the mechanical system used in the Research Residence at Urbana. The purpose of this high bonnet is to provide a plenum chamber wherein the heated air is given sufficient turbulence to record identical temperature readings at any point around the bonnet.

Off this high bonnet the two main warm air supply mains are taken flat against the ceiling out toward the outside walls and turned in easy sweeps toward the wall opposite the furnace. These supply mains are rectangular ducts, but all branches are taken off as square transitions using round pipe for the branch

Branches are all one size of round pipe taken off the rectangular main with round to rectangular transitions and balanced with a splitter damper. The use of one size round pipe reduced costs and simplified installation



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that Mr. Steffner will continue this work for all of
their friends who wish to take advantage of the course.
"Sink or swim, survive or perish,"—this work will
carry on.

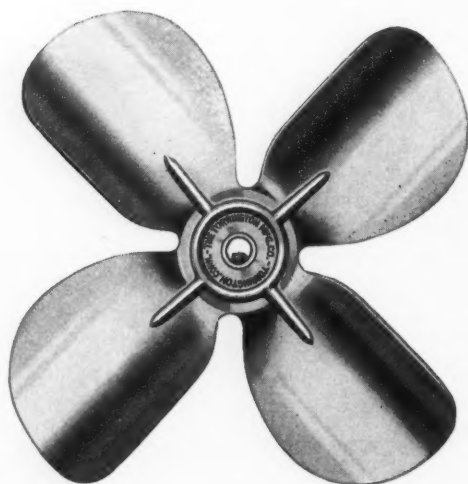
This new organization will also have an announcement
regarding REDUCED PRICES very soon.

Very Sincerely yours,

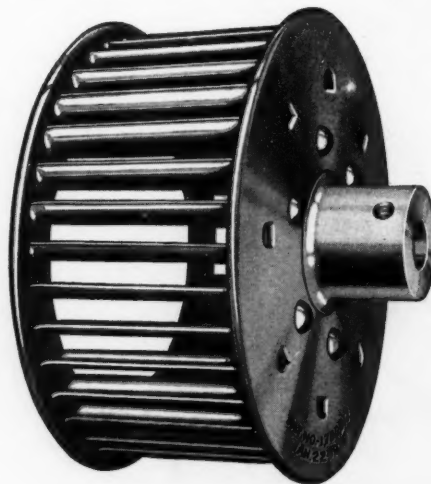
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length. The type of duct construction—Pittsburgh locks horizontally and stiffener drive cleats around the sections—together with the transitions and dampening of the branches is plainly shown in the duct photograph.

The return side of the system also has some interesting features. Air is brought into the blower through four round pipes. The largest of these, the one coming directly into the top, leads from the large return air face located in the small hall at the foot of the stairs. The return from the living room enters the blower through a 7-inch round pipe between the blower and furnace. Attention is called to the fact that these are all round pipes from blower to the boots.

The return from the study is also round pipe from the boot to the blower, with the boot unusual in its length and slope. The return from the dining room is rectangular between joists to a point behind the conditioner where a round pipe drop carries the air to the blower.

Room	Room Basic Factor	Btu x 1000	CFM x 12.5	Pipe x 3.	Register x 6
Liv.	10 $\frac{3}{4}$	10750	131	32 $\frac{28}{28}$	64
Din.	5 $\frac{1}{2}$	5500	68	10 $\frac{1}{2}$ $\frac{28}{28}$	33
Kit.	6	6000	74	18 $\frac{28}{28}$	36
Study	7	7000	86	21 $\frac{28}{28}$	42
N. Hall	3 $\frac{1}{4}$	3450	40	10 $\frac{28}{28}$	20
E. Hall	3 $\frac{1}{4}$	3250	40	10 $\frac{28}{28}$	20
So. Bed.	13 $\frac{1}{4}$	13250	163	40 $\frac{28}{28}$	80
W. "	7 $\frac{1}{2}$	7500	92	22 $\frac{1}{2}$ $\frac{28}{28}$	45
N.E. "	9	9000	110	27 $\frac{28}{28}$	54
Bath	2 $\frac{3}{4}$	2750	34	8 $\frac{28}{28}$	16
Hall	5	5000	62	15 $\frac{28}{28}$	30
		73250	900		

The system was figured by the new Mechanical Code. The factors used to determine Basic Factors, C.F.M., Pipe Area and Register Sizes are shown in the chart above

There are several interesting features in the piping system. Note the regularity in length of the two mains and the branches, the similarity in location of branch takeoffs, the uniformity in branch length. The main was sized according to the 10 per cent reduction method recommended in the code

General Design

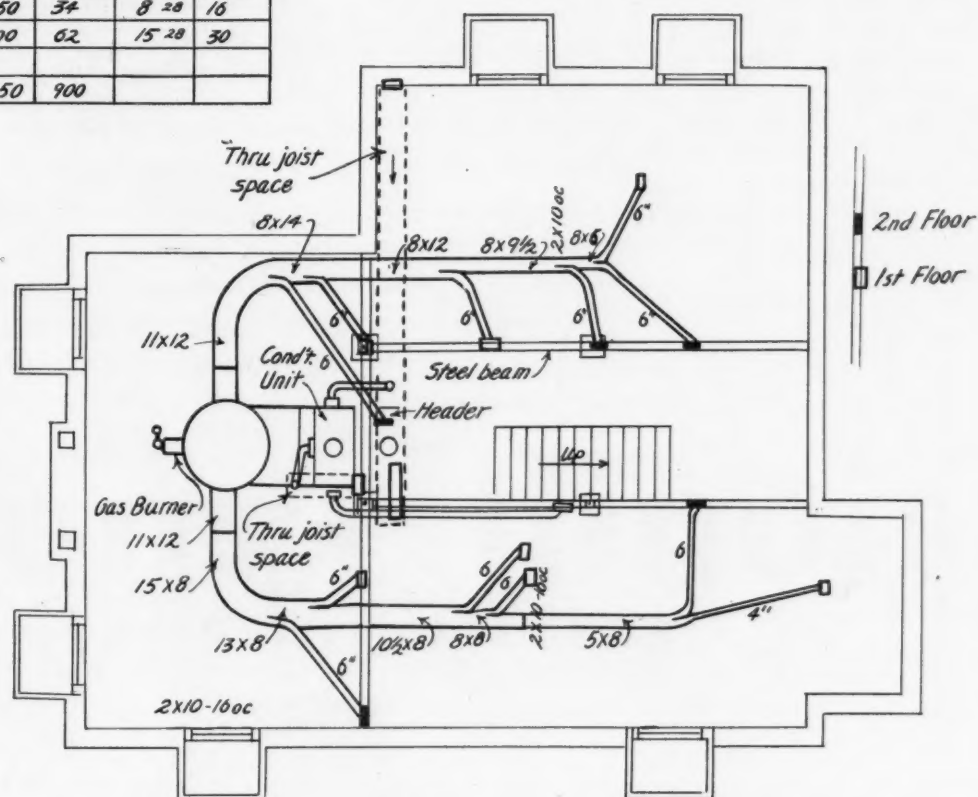
The system was designed according to the Mechanical Code. However, it should be noted that practical experience and a desire for economy introduced some changes, notably the use of all 6-inch round pipe for the branches regardless of the pipe size calculated by the code.

In calculating branch pipe sizes according to the Mechanical Code it happened that most of the branch pipe required areas within a very few square inches of one another. Advantage was taken of this fact to save the owner some money and simplify installation by using all 6-inch pipes.

In operation it was found that these 6-inch pipes were generally a little larger than the area required. This reduced the branch pipe velocities, but by keeping the transitions exactly to size as required by the Code the requisite volume of air was passed into the branches.

Dampers were located at each takeoff and set initially parallel to the continuation side of the main. In operation it was found that practically no change in this setting was required showing that the transition governed the volume while the branch only controlled the velocity and not the volume.

The rectangular mains were sized according to the Code which specifies that where branches meet the main which continues should be equal to the total cross section of the two branches less ten per cent. Thus, the main serving the dining room—kitchen side of the house has, at the extreme end, two 6-inch



BASEMENT PLAN



The house is brick veneer, with insulated walls and a new type, no-weight-well window frame. Low loss and tightness are features.

branches. The main which serves these two branches is sized as follows—each 6-inch pipe has an area of 28.3 square inches. Then, 28.3 plus 28.3 equals 56.6 less ten per cent equals 51 square inches.

To simplify duct fabrication the mains were held at 8 inches deep from the first section off the bonnet to the end of the main. The 51 square inches then requires a rectangular duct 8 inches deep and 6 inches wide. Other sections of the main were sized similarly and the sizes are shown on the piping diagram.

Additional economies were effected by selecting registers of one size—10 by 8—all baseboard type.

Controls

The control system for the installation was worked out by adding practical experience to established findings. In the first hook-up the room thermostat controlled the gas burner. A bonnet limiting control set at 200 deg. was wired into this circuit to prevent overheating. A bonnet switch controlled the fan.

When the room thermostat called for heat the burner came on if the bonnet temperature was below 150 degrees. If the bonnet temperature was above 150 degrees the fan turned on, but the burner remained idle. If and when the bonnet temperature reached 150 degrees the fan turned on and operated until the room thermostat was satisfied. When the room thermostat was satisfied both burner and fan shut off.

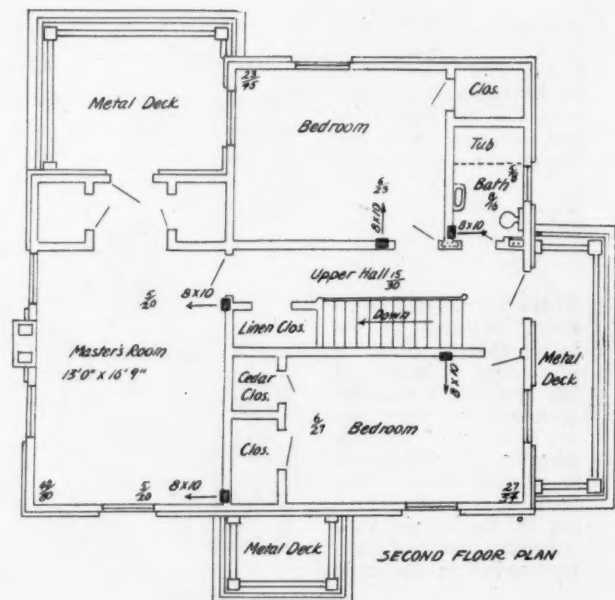
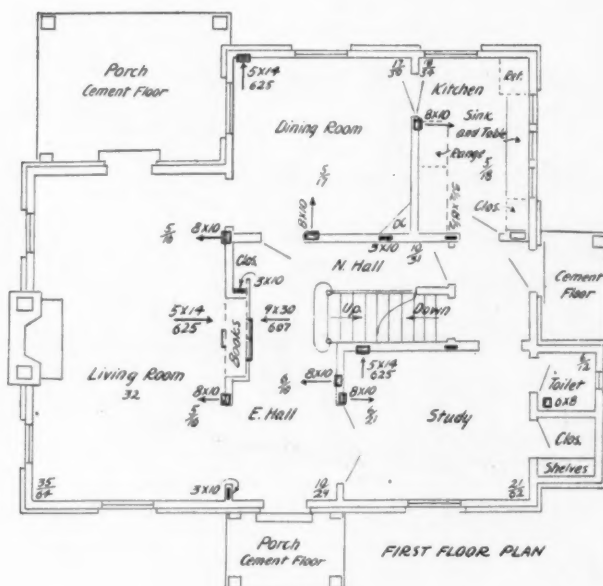
In operation this hookup proved able to maintain room temperatures within two degrees above and below the room setting. The chief trouble, however, was that the furnace was slow in heating up and sometimes as much as 45 minutes elapsed before the fan turned on. During this period the room temperature continued to fall prolonging the "on" cycle of the fan and burner when they did start.

A second hookup was installed wherein the burner was controlled by a bonnet switch. This switch was set to maintain a constant bonnet temperature of between 150 degrees and 200 degrees. The fan was controlled by the room thermostat. A safety switch was installed set at 200 degrees to shut down the burner if the temperature ran over 200 degrees.

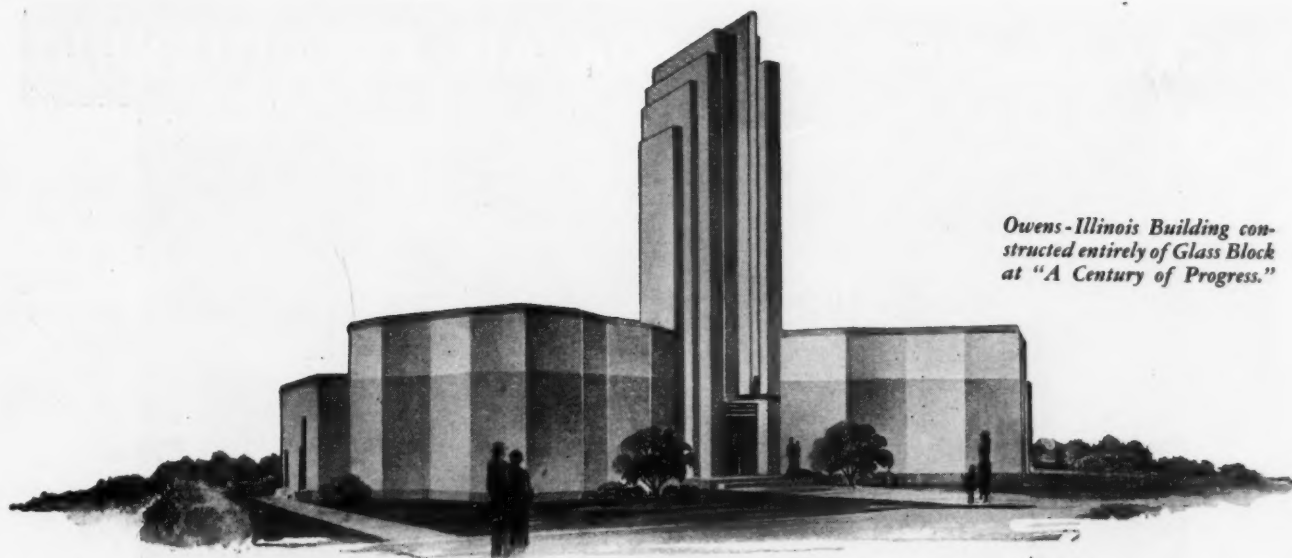
In operation, the bonnet temperature was held between 150 and 200. Whenever the house cooled the room thermostat turned on the fan. Since there was warm air in the bonnet all the time the response of the system to the thermostat was instantaneous.

The only difficulty with this hookup showed up when the weather became mild. In mild weather, where the inside-outside temperature differential was slight, the fan might remain idle hours at a time during the middle of the day. In the meantime the burner came on and went off at the bidding of the bonnet switch. The accumulation of warm air in

[Continued on page 56]



The first and second floor plans above show all return air from the first floor, all registers of one size and good distribution of the warm air supply. The use of one sized branch pipes and one sized registers caused variations in register velocity, but gave volume according to the needs of each room because of the sizing of the transitions



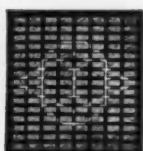
Owens-Illinois Building constructed entirely of Glass Block at "A Century of Progress."

We'll See You at the Fair

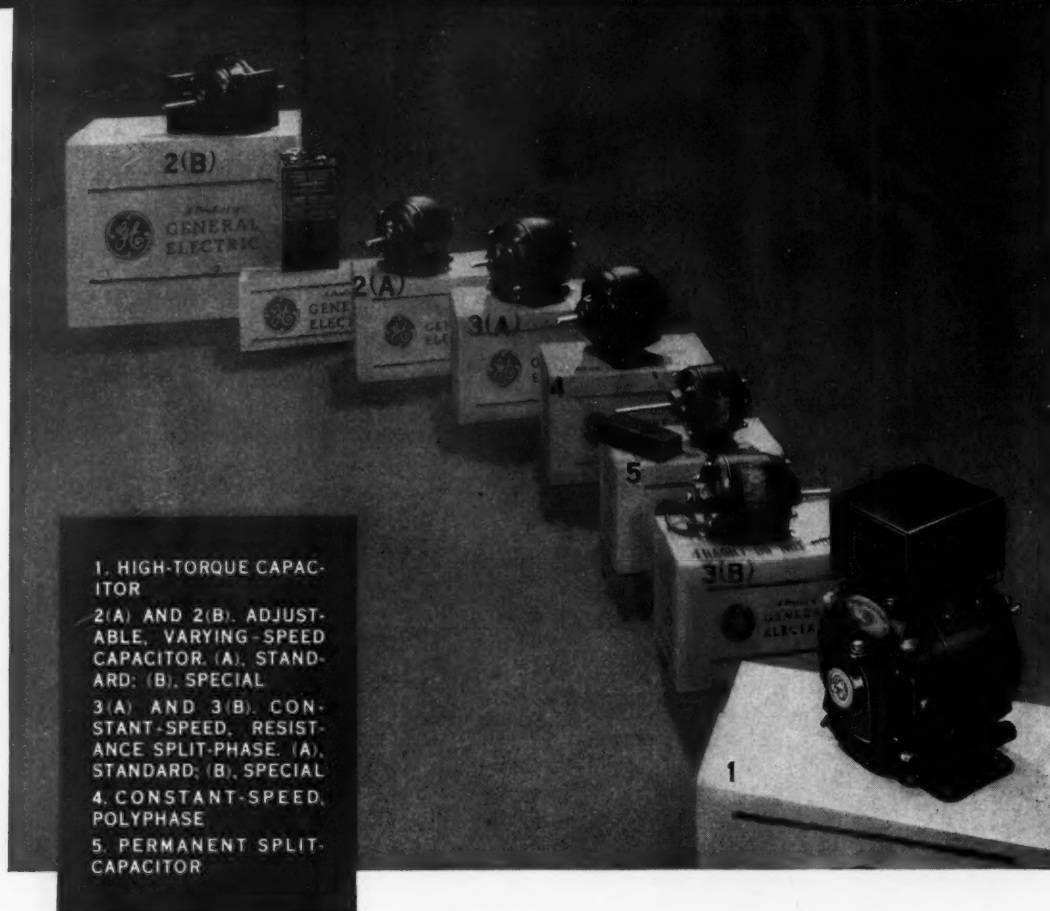
● Naturally, you plan to attend "A Century of Progress" in Chicago. While at the World's Fair every warm air heating distributor, jobber and installer should see the National Warm Air Heating Association's exhibit of warm air furnace equipment in both gravity and forced air types, housed in the beautiful and interesting Owens-Illinois *all glass block* building. Here in this revolutionary structure you will also see blowers, controls, registers, filters, and other important displays. Owens-Illinois has co-operated with your Association in setting up this display, which will show all visitors the very latest improvements in equipment for *clean* warm air heat. This is your exhibit—plan to attend. Industrial Materials Division, Owens-Illinois Glass Company . . Toledo, Ohio.

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Schoolroom Heaters
Special Devices
Unit Coolers
Unit Heaters
Unit Ventilators
Window Ventilators

210-206

GENERAL ELECTRIC

Comfort Cooling *[Continued from page 45]*

important to prevent moisture entering from the outside, so the erection must be carried out with this idea in mind. If the insulation is corkboard the joints must be broken and sealed with hot asphalt, and the outside surface must be mopped with hot asphalt.

The ice racks may be made of 2x4's on edge resting on a perforated sheet metal and a metal frame, which in turn is supported on wooden sleepers. The ice tank should be provided with a bottom drain and an overflow at about the bottom of the racks although many tanks are designed so that the ice will be partly or nearly entirely submerged in water. In some designs a float control is connected with the outside, so that the water wasted is the return from the cooler, and not the cold water from the bottom of the storage tank. If the submerged ice system is used, broken or crushed ice is required so as to provide the necessary surface for ice meltage.

Tests on ice tanks indicate that in the case of crushed ice submerged in water, 36 degree water can be obtained when using a face velocity of $\frac{2}{3}$ ft. per min. and with a maximum variation of temperature of 2 deg. F. With spray heads, designed for about 10 gallons per minute capacity and using a pressure at the nozzle of from 2 to 3 lb. per sq. in. a heat absorption of the ice of about 500 B.t.u. per sq. ft. per hour per degree difference in temperature between the water temperature and the temperature of melting can be obtained. Fine jets of water are satisfactory if the ice is continually tumbled about; otherwise the jets will cut holes through the ice and the water will pass through without proper ice contact. When using sprays on the ice, the water temperature can be reduced to 34 or 35 degrees.

Costs

The cost of the equipment for ice cooling varies considerably with the design. In general it will be the same as in the case of cooling with water with the addition of the ice storage tank and the pump or pumps required to circulate the water. Undoubtedly the ice tank can be skimped, but it will not be wise to do so unless the season is short or the service expected is only occasional.

The cost of the tank in the research residence was \$500, the motor driven pump was \$75 and the sprays \$70, with an addition for the piping, automatic valves, etc., of \$100, making a total of \$675. To this must be added the cooling coils, which represent an investment of \$200. Probably certain items, such as the insulation of the tank, which could be granulated cork with sheathing on the outside, use of sprays instead of coils, etc., would make it possible to reduce the cost to a total of \$600 or even \$500.

Humidity Control

The psychrometric chart is very useful in order to understand air conditioning. For example, if air is cooled to 60 deg. F. and 80 deg. F. is maintained in the room, as it was during the comfort cooling tests, the relative humidity will be 50 per cent. The weight of water vapor in the house is determined by the tem-



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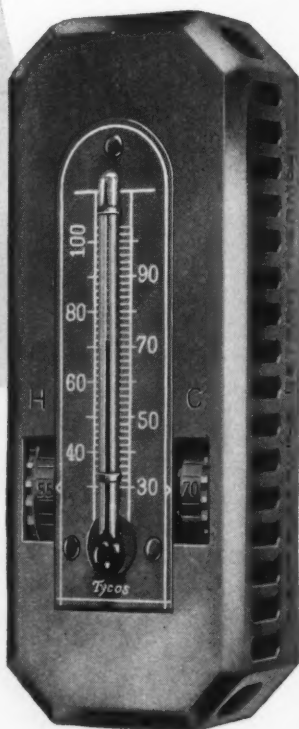
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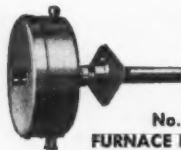
heating and cooling THERMOSTAT

One thermostat can control the heating in winter and the cooling in summer when you use the "Genuine Detroit" No. 445 Heating and Cooling Thermostat. It has two blades, each on separate circuit, with separate temperature adjusting dials.

There is a complete line of "Genuine Detroit" controls to meet every requirement for air conditioning. Among others are the No. 697 Humidistat, No. 448 Furnace Limit Control and No. 640 Electric Water Valve. Write now for Bulletins Nos. G-39B, G-59 and G-61.



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No. 448
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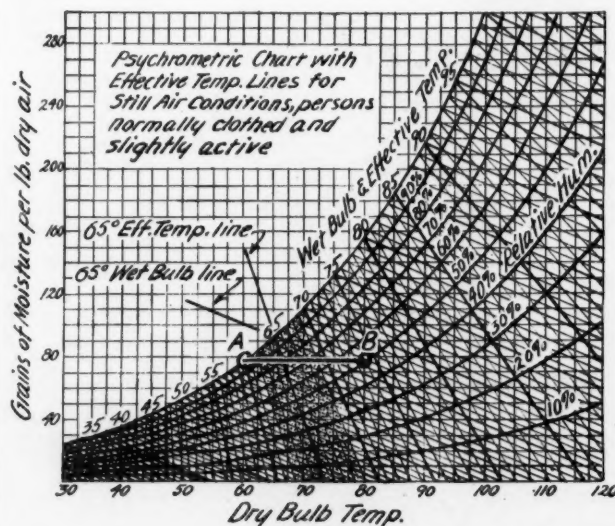


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 DETROIT, Mich., U. S. A.

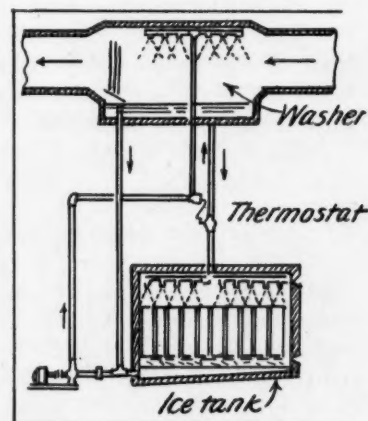
Lubricators • Carburetors • Valves
 Automatic Controls for temperature, pressure, humidity
 Refrigeration, Oil Burner and Heating Accessories



Air is cooled from 80 degrees dry bulb to 60 degrees dew point along the line B-A, corresponding to 77.3 grains (0.01105 lb.) water vapor per pound of bone dry air. Infiltration of water vapor tends to increase this vapor content, but cooling the air to the dew point temperature of 60 degrees restores the moisture content to 77.3 grains and maintains 80 degrees and 50 per cent relative humidity

perature of the air leaving the coils. At 60 degrees the maximum weight of water vapor per one pound of bone dry air is 0.01105 lb. If the air circulated by the fan from the rooms of the house has more water vapor than this weight, the excess will be condensed, and during the research house tests amounts varying from 75 to 113 lb. were condensed out of the air during test periods of 24 hrs. If the room dry bulb temperature is fixed it becomes an easy matter, by observation of the psychrometric chart, to determine the weight of moisture and the dew point temperature required to hold the room at any desired humidity.

In the research house the ice water entering the cooling coils was maintained at 35 deg. F. Control of the temperature in the rooms was obtained by means of a modulating by-pass damper operated from a room thermostat. The amount of air cooled by the ice water will therefore depend on the temperature of the air in which the thermostat is located, and therefore the room temperature will be kept constant, and whatever air is cooled will be dehumidified to the amount corresponding to the lowest temperature reached by the air leaving the coils. This method has been found to



In this system the temperature of the spray water is maintained constant by a by-pass thermostat which controls the amount of water passed through the ice chamber sprays

give good results, as the room temperature and the moisture content of the air are regulated to a specific amount.

Another control is that for the regulation of the temperature of the water leaving the ice bunker room for the spray chamber or for the air cooling coils. A thermostat set for the desired temperature operates a three-way diaphragm valve which permits all or no water to pass to the sprays located over the ice in the ice tank. Should the temperature of the water leaving the reservoir below the ice racks attain too low a temperature, the return water from the air conditioning spray chamber will be by-passed directly to the reservoir without contact with the ice. The relative amount of by-passed water will be controlled so as to keep the temperature of the water at the circulating pump at the amount that the thermostat was set for, which is usually 45 deg. F., but can be any amount above 33 or 34 degrees.

A Typical Calculation

According to the results of the research residence comfort cooling tests a maximum load of 24,200 B.t.u. per hour was indicated. The ice required to absorb this load, using a latent heat of the ice of 144 B.t.u. per pound of ice and not allowing for the refrigeration in the ice water, will be $24,200 \div 144 = 168$ lb. of ice per hour. If the water enters the coils at 35 deg. F. and leaves at 50 with a rise of temperature of 15 degrees, the water circulated will be

$$24,200 \div (15 \times 8\frac{1}{3}) = 193.5 \text{ gal. per hour.}$$

Where 24,200 = the maximum load.

15 = degrees of temp. rise in the water.

$8\frac{1}{3}$ = weight of 1 gallon of water at 62°.

The research residence operated with a water rate of 396 gal. per hour or with a rise of temperature of about 7.5 degrees. Just what is the best condition of operation is hard to say offhand. A higher velocity of the water through the coils will permit the use of smaller cooling surfaces, but it will cost a larger amount in electric power to pump the greater amount of water.

The amount of air to be circulated has to be calculated from the sensible heat load. If the latent heat is 25 per cent of the total, then the sensible heat is 75% of 24,200 B.t.u. or 18,150 B.t.u. per hour. The heat absorbed by the air per pound of bone dry air at 60 degrees dew point temperature and 81 degrees dry bulb = $0.2465 (81 - 60) = 5.18$ B.t.u., taking the specific heat of the air as 0.2465. The weight of air handled will be $18,150 \div (60 \times 5.18) = 58.4$ lb. per min.

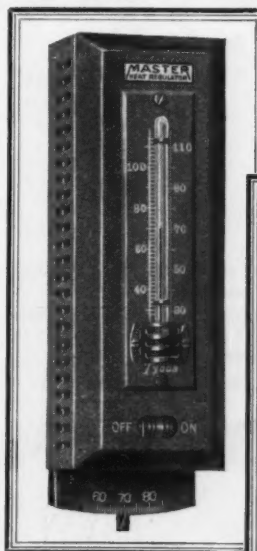
The volume of this air becomes $58.4 \times 13.33 = 780$ cu. ft. per minute where 13.33 is the volume of one pound of bone dry air saturated with water vapor at 60 deg. F.

Conclusions

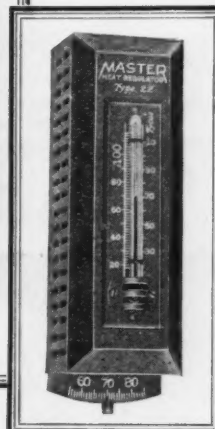
For the residence ice gives the ideal means of cooling where there is a reliable source at a nominal cost. The equipment is nominal in first cost. The operating cost is heavy while the plant is in operation and it cannot possibly compete with electric refrigeration if the season is prolonged. If the latitude is not much farther south than Indianapolis, Indiana or Peoria, Illinois, probably ice will be the best means of cooling of residences in the summer.

Heat Regulators

with
**PERFECT
 CONTROL**



*Above Type 144
 At Right Type 122*



*Write today
 for full in-
 formation
 and discounts.*

Everything that is essential to the successful performance of heat regulators is built into the Master Heat Regulators, Types 144 and 122, the latest Master contribution to comfortable and economical home heating.

These Master Heat Regulators possess a distinctive combination of the following features — very

small current in the thermostat circuit—platinum iridium contacts—extremely sensitive thermostatic elements—non inductive motor starting switch—powerful, quiet motor. These features properly combined as they are in only the Master Heat Regulators place them in a superior class and give consistency of performance unequalled.

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WANTED

Men Who Can Sell

Oil-Burning heating and air conditioning equipment for a manufacturer outstanding in its industry offering a product with unusually attractive selling points to rated firms in exclusive territories.

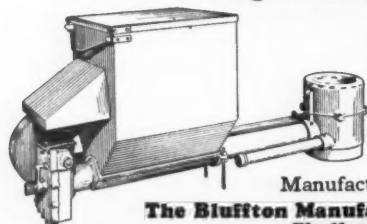
You will be furnished with full instruction for the job and backed by the finest set-up of support materials ever offered to dealers in this field, including special co-operative advertising for dealers.

With this splendid product you can offer the dealer dated shipping; a time payment plan; free advertising materials; a proved retail selling plan including sales presentation and unique record of operating data from actual users . . . and above all a name universally known to stand for quality.

Straight commission of 15% paid half on approval of order and balance when merchandise is paid for. Will consider part time or side-line men if of sufficient calibre. Prompt action essential . . . Address Key 233, "American Artisan," 1900 Prairie Ave., Chicago.

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upon which to build
a permanent and
profitable business.

Domestic, Commer-
cial and Industrial
Sizes.

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Findlay, Ohio

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Conditioner which circulates, fil-
ters and humidifies air under defi-
nite and accurate control, operat-
ing with any heating system. Also
the simple, practical, efficient and
trouble free Humidifier shown
below for warm air furnaces.

Patent
Pendine

Model "C"
Columbus Humidifier

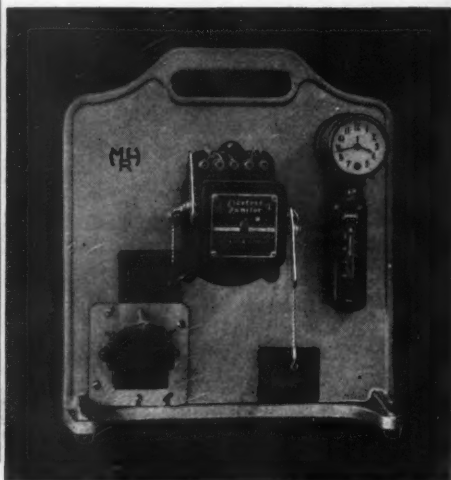
THE COLUMBUS HUMIDIFIER CO.
154 N. FIFTH ST., COLUMBUS, OHIO

This ELECTRIC JANITOR DEMONSTRATING DISPLAY

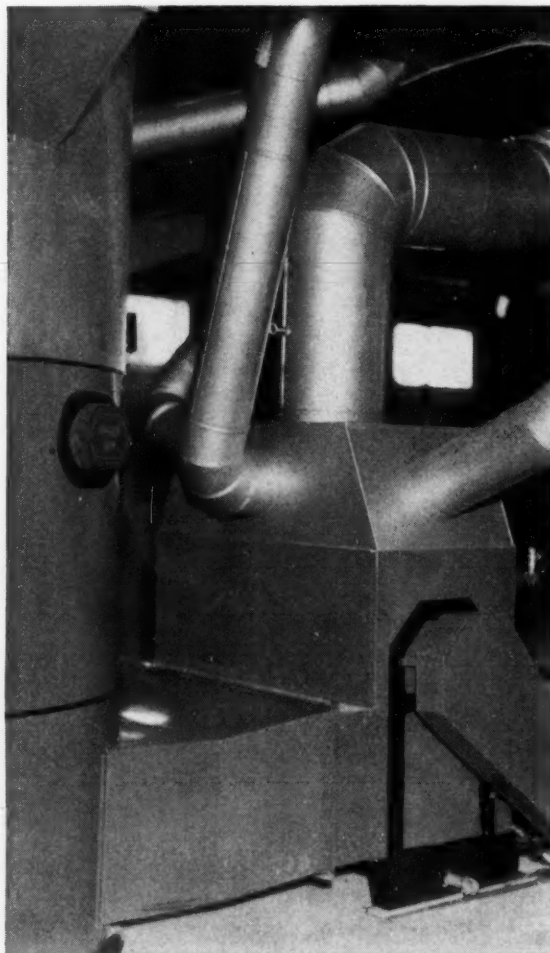
WILL BUILD SALES

■ THIS completely equipped display and demon-
strating stand, ready for mounting your Electric Janitor,
either model, is supplied without cost with orders for
8 or more Electric Janitors, Minneapolis-Honeywell's
lowest priced regulator for all domestic coal, coke
or similarly fired heating plants. Order through your
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Honeywell Regulator Company, 2726 Fourth Avenue
South, Minneapolis, Minnesota. Branch and distribu-
ting offices in all principal cities.

MINNEAPOLIS-HONEYWELL
Control Systems



An Illinois Installation [Continued from page 50]



This photograph of the conditioner shows the ex-
cellent appearance secured with aluminum paint, also
good workmanship and a general attractiveness

the bonnet caused a gravity flow which kept the house
warm enough, but the owner felt that his gas cost
was too high for such mild weather.

The control system has now been changed back
to a hookup practically the same as the first. The
room thermostat operates the burner as before. A
limit switch is placed in the bonnet and set at 200
degrees to prevent overheating of the furnace. The
fan is controlled off a bonnet switch set as close as
possible—about 15 degrees—at settings of 140 to 155
degrees. When the room thermostat is satisfied both
burner and fan shut off.

Jack Stowell's experience with this control sys-
tem emphasizes a feature which has been given little
attention. This particular house is especially low in
heat loss. The house is brick veneer with $3\frac{1}{2}$ inches
of insulation in the walls. The windows are special
without weight wells and both inside and outside sash
weather stripped. The heat loss is very low for a
house of this size so that "on" cycles of burner and
fan are infrequent during mild weather. Control sys-
tems which operate satisfactorily in houses where heat
loss is rapid seemingly do not operate with the same
satisfaction in houses of this type.

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4 cents for each word including heading and address. Count seven words for keyed address. Minimum \$1.00 for each insertion. One inch \$3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date.

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Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. Address L. K. Diddle Company, Marshfield, Wis.

SITUATIONS OPEN

WANTED:—RELIABLE COMBINATION plumber and tinner, who wishes steady work and advancement, to invest small amount in going business in middle west. Address Key 237, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATIONS WANTED

SITUATION WANTED—BY AN EXPERIENCED tinner, plumber and hardware clerk. Small town no objection. Will work on salary or operate shop on percentage basis. Have operated shop for myself for 16 years. Central west, Pacific coast or Colorado preferred. Address Key 222, "American Artisan," 1900 Prairie Avenue, Chicago, Ill.

TINNER, FURNACE AND ROOFING man wants position anywhere west of Mississippi River. Twenty-one years' experience. Have run shop for seven and one-half years. Married and does not drink. Also complete set of tinner's tools for sale. Address Key 220, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

SITUATION WANTED—WOULD LIKE A position in central or southern Wisconsin. Have had over twenty years' experience in furnace and plumbing work, electric wiring, pump and wind mill work and all lines that come into a small town hardware store. Married and willing to work for reasonable wages, if steady with a future. Address Key 219, "American Artisan," 1900 Prairie Ave., Chicago, Illinois.

WANTED: POSITION AS TINNER AND plumber. Have state license. An expert hot air furnace worker; also back bar and brewery work. Steady, sober, good habits. Good references. Address Key 229, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

ALL AROUND SHEET METAL WORKER and heating expert and plumber, sober, steady and reliable, wants position. Will go anywhere and can do any job. Reasonable wages. Address Key 226, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

WOULD LIKE TO CONNECT WITH someone who does blow pipe work around a glass house that manufactures bottles. I am an experienced man in that line and also the other sheet metal work and outside work. Will go anywhere. Address Key 227, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

SITUATION WANTED: PLUMBER AND sheet metal man, with fifteen years' experience, now open for a steady place. What have you to offer? Address Key 228, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

TRAINED AND EXPERIENCED ME-chanic wishes position in first class sheet metal shop. Can design, lay-out, build and erect most any sheet metal, hard shingle and tile roofing job that comes along. Especially experienced in cornice, skylight, window and door work, gutters, ventilating, etc., on churches, schools, residences, etc., in metals as iron, copper, aluminum, zinc, stainless steels, etc. Will gladly furnish references upon request. Address Key 232, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—SHEET METAL worker first class, twenty years' experience, A No. 1 lay-out man and estimator. Am a registered plumber and first class lead worker, fully experienced in all heating, large and small jobs as well. I was foreman on three government jobs, factory trained in Oxy-Acetylene welding, best of references. Will take a shop on percentage. Good salesman, honest, sober. Will go anywhere, prefer the east. Address Key 235, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

FIRST CLASS, THOROUGHLY EXPE-rienced, practical roofing and sheet metal estimator desires connection with a substantial concern. Address Key 230, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—A FIRST CLASS tinner and plumber, steam and hot water fitter. Can do all kinds of repair work, radiator and pump repairing. Wants to rent or run shop on commission. Address Key 238, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

TINNER AND FURNACE MAN WANTS steady job, any place. I can lay out, figure and estimate. Cut own patterns and assemble same. Would like to hear from some reliable firm. Small town no objection. I can also do plumbing. Write for further details. Address J. R. Alexander, 1006 Coolbaugh St., Red Oak, Iowa.

SITUATION WANTED—BY AN ALL around sheet metal worker; one who can handle all branches of the trade as well as plumbing, steam and hot water heating. Have had 22 years' experience and can run shop, estimate and sell. Prefer connection with hardware store doing this line of work or one who is planning on it. Can furnish references as to character and ability. Address Key 218, "American Artisan," 1900 Prairie Ave., Chicago, Illinois.

FOR SALE

COMPLETE STOCK OF TOOLS AND sheet metal for sale—Will inventory about \$1,500. A. L. Henschen, 116 N. Bluff Street, Joliet, Illinois.

FOR SALE—IN WISCONSIN CITY OF 4,000, first class sheet metal and heating shop. Price right. Rent reasonable. Address Key 231, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

FOR SALE—ONE COMPLETE SET OF tinner's tools and stock, with or without shop. Residence and garage. Business has been established eleven years. Address Key 236, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

WANTED TO BUY

WANTED—BY FIRST CLASS MASTER plumber and steamfitter, can also do sheet metal work, a shop to run on commission basis or a Service-at-your-Door Truck. Will furnish truck and set of tools where town and conditions will warrant it. Must be in Illinois. Address Key 234, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

WANTED—A TEN FOOT CORNICE Brake. Must be in good condition. J. V. Patten Company, Sycamore, Illinois.

WANTED TO HEAR FROM SOMEONE who has 4-foot used cornice brake for sale. Write to J. D. Jacimore, Russellville, Ark.

WANTED TO BUY: ONE USED FUR-nace cleaner. State make and price. Address M. J. Tomsho, 120 E. Broad St., West Hazleton, Pa.

WANTED: A SECOND-HAND VACUUM cleaner of the portable type. Must be in good working condition. Also a setting-down machine, hand type, second-hand. A. R. Harris, 4548 Hohman Ave., Hammond, Ind.

MISCELLANEOUS

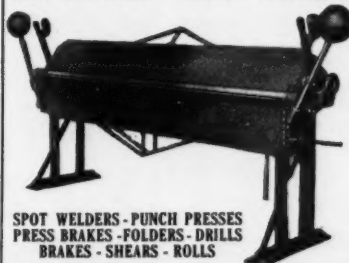
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Philip V. W. Peck

Barrister Bldg., Washington, D. C.

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Groovers, each 10.50 8" blade, each..... 30.00

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Bead is cut back, making it easy to put gutter together. Requires no soldering—not affected by expansion or contraction.

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Eaves Trough . Gutter Hangers . Conductor Pipe
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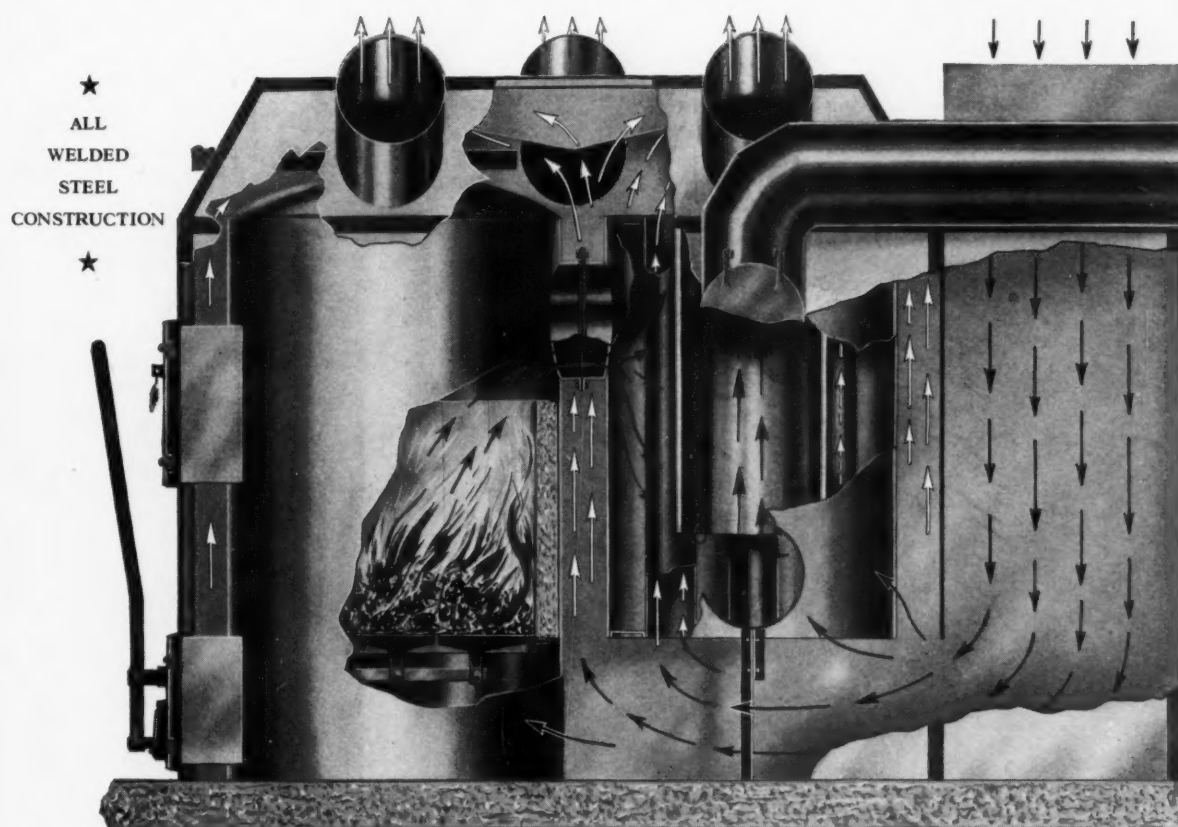
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by Selling

The BRUNETT "DUAL"

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THE ONLY FURNACE MADE WITH A PATENTED BRUNETT HEAT UTILIZER

By selling the Brunett "Dual" Warm Air Heating System and Patented Brunett Heat Utilizer, you can increase your business and also have satisfied customers.

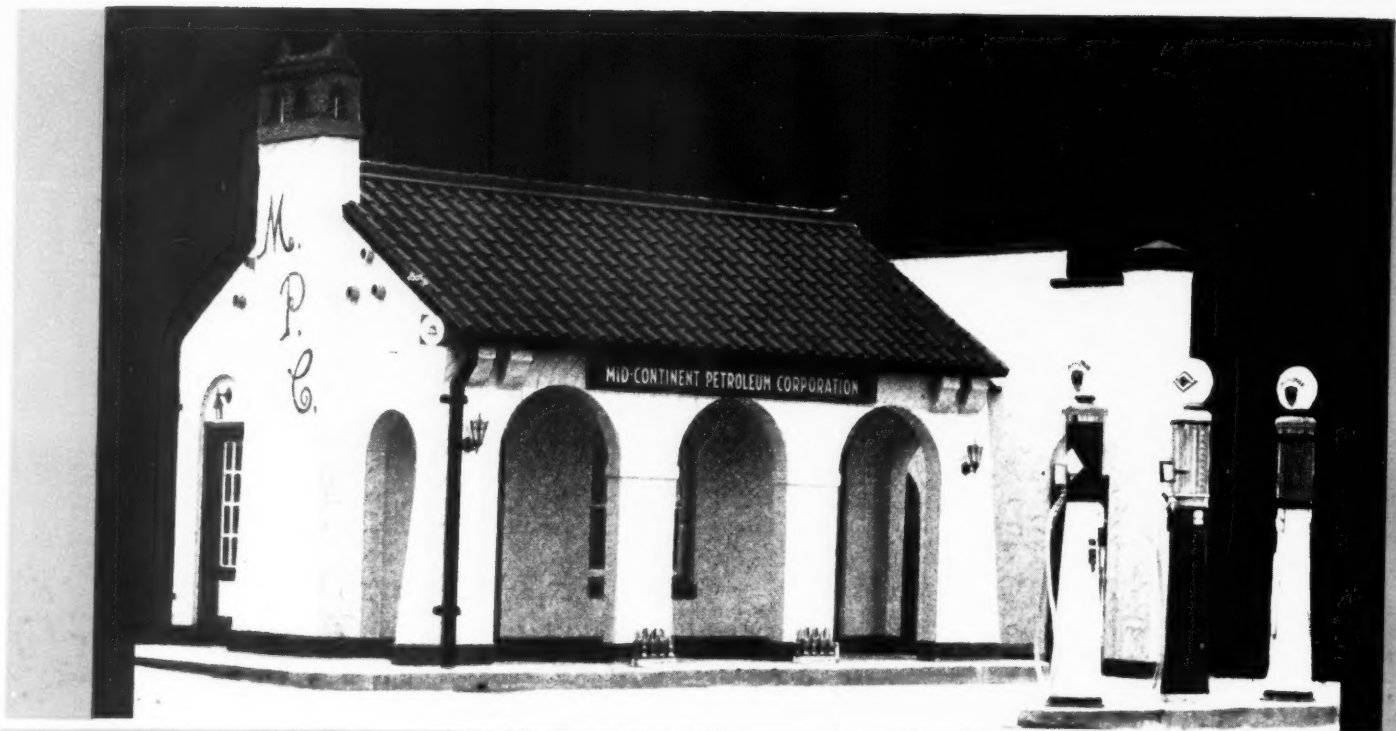
The Unit is built to give the highest efficiency (91.707%) because of the patented Brunett Heat Utilizer, which is a "Built-In" feature of the System. It saves your customer 25 to 60% of his fuel bills, which makes it easy to sell. The Patented Brunett Heat Utilizer can also be installed in connection with Heating Plants that are in operation.

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BUILDERS OF THE WORLD'S LARGEST ONE UNIT WARM AIR FURNACES
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